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Vincit qui Patitur.
EDWIN D. MORGAN, JR.

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CLINICAL

LECTURES ON SURGERY.

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BY

M. NÉLATON.

FROM NOTES TAKEN BY

WALTER F. ATLEE, M.D.

> "Nulla est alia pro certo noscendi via, nisi quam plurimas et morborum, et dissectionum historias, tam aliorum proprias, collectas habere, et inter se comparare."
>
> MORGAGNI, *De sed. et caus. Morb.*, lib. 14.

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TO

MY FATHER,

JOHN L. ATLEE, M. D.,

OF LANCASTER, PENNSYLVANIA,

This Volume

IS INSCRIBED.

PREFACE.

The great number of students, from all parts of the world, who crowd the wards of M. Nélaton, in the Clinical Hospital of the Faculty of Medicine, of Paris, testify the value of his instructions.

This volume contains the publication of notes taken, during a period of three years, 1851–52–53–54, from the remarks he made upon cases to which attention was particularly directed. The course adopted in their arrangement has been, as a general rule, to class under the same head those in which the same pathological lesion existed, though in some few instances, when the great interest of the case lies in the diagnosis, this plan has been departed from, and the case has been classed with others, from the fact that it was *not* one of them.

When any remarks have been made, in addition to those of M. Nélaton, they are so placed as to be at once distinguished. This has been done very rarely, in fact almost solely, in order to make the work, as respects surgical pathology, more complete, by stating the results of microscopical investigations. These results have been taken from the works of M. Charles Robin, and of M. Lebert.

WALTER FRANKLIN ATLEE, M.D.

PHILADELPHIA, *July*, 1865.

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CLINICAL SURGERY.

CHAPTER I.

BURNS, CONTUSIONS, ETC., ETC., ETC.

A WORK on Clinical Surgery is not the place for the consideration of Inflammation; but the importance of the subject, and the novelty and value of the following observations, warrant their insertion.

The recent experiments of Bernard, on the great sympathetic nerve, show that this nerve plays a great part in the phenomena of inflammation. They show, in fact, that when it is cut, the part of the body to which it is distributed, becomes congested, and its temperature is elevated as much as in inflammation; for certain organs, indeed, as for instance the pleura, there is true inflammation.[1] Besides the elevation of temperature, and the very evident increase in the pressure of the blood in the capillaries, there are very important modifications in the physico-chemical characters of the blood that has passed through these parts; it coagulates almost immediately when withdrawn from the body; the venous blood becomes almost as red as that in the arteries, and the arterial blood, on exposure to the air, becomes dark almost immediately, from the absorption of carbonic acid, while the normal blood only does so at the expiration of eighteen or twenty-four hours. The experiments, moreover, show that this nerve has a direct action upon the dilatation and narrowing of the large vessels that it accompanies, and, if it is cut, they remain more dilated on that side than on the other, a fact corresponding to the one often observed in comparing an inflamed organ to the one corresponding to it on the opposite side of the body.

---

[1] Bernard made his experiments chiefly in the cervical region, as there the nerve is more easily reached; they have also been made with the same results in the thorax, by removing the first thoracic ganglion, and in the abdomen by acting upon the ganglions of the solar plexus. When other parts of the great sympathetic were acted upon, and particularly the great and small splanchnic nerves, the same effects were not obtained, which proves that there is still a distinction to establish in the different parts of the sympathetic nerve, relatively to this production of heat.

When nerves of the cerebro-spinal system are resected, the effect, so far as the heat of the parts to which they are distributed is concerned, is directly the opposite; a diminution of temperature is always observed. The experiments for this purpose were made on the fifth pair; on the facial in the cranium, and the anterior and posterior roots of the spinal marrow. The great sympathetic is the only one whose section produces an increase of heat.

These experiments of Bernard are capable of throwing light on the *direct causes* of inflammation, of which so little is known. It is well known that wounds, contusions, the sudden cooling of a part, &c., are *indirect causes* of inflammation, but how these different causes lead to the narrowing of the small veins and arteries, and also of the capillaries (for they are contractile, although without muscular fibres), and then to their dilatation, in other words, to the succession of phenomena characterizing inflammation, it is difficult to explain, without a knowledge of this influence of the great sympathetic.[1]

Inflammation is a complex morbid phenomenon, but it is most particularly connected with the function of the circulation; it is indeed rather a succession of phenomena taking place in the capillaries, and characterized as follows:—

First. By a diminution in diameter of the small arteries and veins, the capillaries properly so called, or the intermediary vessels, taking as yet a scarcely perceptible, though a very real part in the phenomenon.

Secondly. By a repletion or dilatation of the capillaries with greater slowness, oscillation of their circulation: this characterizes simple *congestion.* But there is *inflammation* when the phenomena are followed by complete arrest of circulation, with repletion and distension of the capillaries (from accumulated blood-corpuscles), and by degrees of the small veins and arteries of the part, above all of the small veins; for the capillaries, by which they are furnished with blood, ceasing to supply them, the current in them becomes very slow and finally ceases altogether; they only receive blood from the collateral capillaries, and that gradually, with a force gradually diminishing, so that the blood-corpuscles accumulate in them, without going further.

---

[1] It has been shown that there are in the nerves of organic life, as in those of animal life, *sensitive tubes* and *motor tubes;* distinguished from one another by the existence in the former, in some part or other of their course, of the ganglionary corpuscle. From different researches that have been made, it is very probable that, as in nerves of animal life, the sensitive nerves, in the apparatuses of organic or nutritive life, preside over the sensibility peculiar to them, and the motor over involuntary motion.

Thirdly. To these phenomena succeed the *resolution* of the inflammation, *induration*, *suppuration*, or *gangrene.*

The resolution of the inflammation is the separation of the accumulated blood-corpuscles, with re-establishment of the course of the blood, which takes place first at the periphery where the corpuscles are least pressed together, and have been so for the shortest space of time; the circulation is re-established last of all in the very small vessels, and the intermediary capillaries.

Induration is owing to the generation of solid or half-solid anatomical elements, either amorphous, or with the form of fibres, etc., among the normal elements.

Suppuration is the production of globules of pus, at the expense of the liquid exuded from the vessels, with separation and destruction of a part of the elements of the inflamed tissue, where the production of the pus is taking place.

Gangrene is mortification, cessation of the phenomena of nutrition, followed by the destruction of the elements of the tissue, generally by putrefaction. Mortification takes place when the arrest of the globules has taken place in so large a mass of tissue and has lasted so long a time, that the anatomical elements can no longer derive, one from the other, the materials of assimilation, and throw off those that have ceased to take part in the acts they accomplish, or those of dis-assimilation. When nutrition, or this continual double movement of combination and decombination, the most simple and most general of all vital properties, ceases, the part is dead, and becomes subjected to the conditions of destruction of organic substances, that is to say, moisture and an elevated temperature.

The dilatation of the capillaries, the accumulation of the blood-corpuscles, and the exudation from the vessels, are the three phenomena by which the redness, the swelling, and the pain of inflammation are caused; pain, so much the greater as the tumefaction caused by the dilatation and by the exudation leads to greater compression or *strangulation*, in consequence of the presence of aponeuroses, fibrous fasciculi, areolæ of bones, &c.

The heat of inflammation is not caused only by the fact of the afflux of blood in the dilated vessels, for when a part is gorged with blood from the application of a ligature, instead of its temperature becoming increased it is diminished, and it is well known that after the section of the fifth pair of nerves, the conjunctiva becomes very red, and the capillaries there as well as in other parts of the face become very visible, and yet there is always a diminution of temperature in these cases. The increase of heat in inflammation is certainly owing also to modifications in the phenomena of nutrition, under the influence of the great sympathetic nerve. There are without any doubt intimate relations, that every one must recognize, between the phenomena of calorification and of vascularization, but, as just shown, increased vascularity can exist without increased heat, and M. Bernard has demonstrated by his experiments that after the section of the sympathetic nerve, there is an increase of heat in the organs to which it is distributed, even when the arteries and veins of the organs have been tied so as to prevent the afflux of blood, caused by this section.

Of the four phenomena characterizing inflammation, redness, swelling, pain, and heat, the influence of the sympathetic can account for the first three, and its influence alone can account for the fourth.

Burns.

April, 1854. A young man, who had a burn upon the external part of the right thigh. Wishing to take a match from the pocket of his pantaloons, it became ignited; the fire was communicated to a number of others he had in the pocket, and to both pairs of pantaloons—for he had on the working pair, which is worn over the other.

This wound, which was thirteen inches long, and nine wide, presented the several degrees of burn, at least so far as the skin is concerned. Towards the centre, the color was gray, yellowish, the normal color of the skin was gone; at the same time, this portion was harder, and of firmer consistence, and its sensibility was completely abolished. Further on, toward the circumference, was a portion, where only the more external parts of the derm were destroyed; still further, one, where the epidermis was raised up by serum, the skin was slightly swollen, and covered by the blisters; still further, at the circumference, there was a small rosy band.

Dupuytren has the merit of having pointed out, better than any one, the characters proper to each degree of burn, and the consequences resulting therefrom, as regards the cicatrization and the treatment. To the precision with which he has done this, is owing the success of his classification, which is the one most generally employed at the present day, in science, and particularly in practice. The six degrees comprehended therein are thus characterized:—

1. Redness of the skin.
2. Cutaneous inflammation, and formation of blisters.
3. Formation of blisters, and destruction of the external surface of the derm.
4. Disorganization of the whole skin, to the cellular tissue.
5. Disorganization of all the superficial parts, and of the muscles to a greater or less distance from the bones.
6. The carbonization of the whole thickness of the part burned.

In this case, the cicatrization would take place with the greatest simplicity. Where the burn was of the first degree, a furfuraceous pellicle would come away and the epidermis would be renewed. Where the burn was of the second degree, the old epidermis raised up by serum, in large blisters, would dry and fall, and in eight or twelve days the integuments would return to their normal condition; *there would be no cicatrix.* Where the burn was of the third degree, there would be a cicatrix, but one formed with great rapidity; it is not rare to see one form from one day to the next; and, if not in twenty-four, in forty-eight hours. Where the burn was of the fourth degree, another series of phenomena would take place; after the elimination of the parts destroyed, a cicatrix would form, quite rapidly at first, but, towards the end, with very great slowness; at least six weeks would be demanded for its accomplishment.

Besides this, the patient was strong and hearty, and there was no febrile reaction worthy of notice.

The local application made use of was one of lime-water and oil, applied by means of compresses.

Seventeen days afterwards, the first and second degrees, of course, were well; the eschars in the other places had fallen, and showed that nowhere had the skin, in its entire thickness, been destroyed; it is sometimes impossible to say, at first, if the whole thickness has been destroyed or not. At the expiration of another week, the whole place was healed.

November, 1851. A young man, seventeen years of age, who had been extensively burned by boiling water, a large portion of the skin having been destroyed, died in the hospital, ten days after the accident. The death was *sudden*, and this, M. Nélaton said, is not uncommon in cases of burns.

At the autopsy, alterations of the lungs were found. The left lung was heavy, evidently not in its natural condition; it was in a state of *engouement*, the first degree of pneumonia. There was hepatization at the base of the right lung. At the apex of the right lung was a tubercle, or rather an agglomeration of tubercles; there was also a mass of them in the corresponding part of the left.

It should be said that during life, M. Nélaton had had no doubts as to the existence of this pneumonia; the patient, however, always laid upon his back, and, on account of his burns, it had been impossible to auscultate or to percuss his chest.

December, 1853. A young man, with a small burn upon the arm from melted tin; the burn being one of the third degree.

In these cases, the external surface of the derm is converted into an eschar more or less deep, and after its elimination the part heals with extreme rapidity, and there is no danger of retraction of the cicatrix as there is when all the derm has been destroyed. In treating a burn of the fourth degree, the part affected should be so placed that the cicatrix may form as large as possible, in order that when the retraction takes place, it shall not be so injurious. In the third degree, this attention to position is not necessary.

Before remaining many days in the wards, this patient one day had a liquid stool; the next he had another, and the same day vomiting began, and cramps in the legs, with pains in the abdomen, whether from colic or from the muscles it was not easy to say; at the same time the face was sunken and dark, the pulse very feeble, and the voice profoundly charged.

Mustard was applied over the abdomen, and seltzer-water was given internally. A drink, containing twenty-five drops of sulphuric ether was given very frequently.

The patient's condition improved, and his friends then removed him from the hospital, where, at that time, there was a good deal of cholera.

February, 1854. An Italian, a waiter in a restaurant, engaged in sealing bottles of wine, placing the vase containing the melted wax upon his head, attempted thus to descend the stairs leading to the cellar; he made a misstep, and the liquid was thrown over him. He was brought at once to the hospital, his whole head covered with a layer of green wax.

There was a difficulty in this case, as to what was to be done. The removal of the wax was indicated, but it was strongly adherent; ether and alcohol would take it away, but their action is very slow, and, moreover, it would be too painful to the burnt parts; heat, of course, could not be used. The interne, when the patient was first brought in late in the evening, removed as much of the wax as he could, and with it the epidermis came also. That in the hair was left, for he could not be persuaded to have it cut. The poor fellow had an idea that without his hair, he would be unable to gain his livelihood, that no one would employ him. On the hands, the layer of wax was still adherent in many places; and, where the skin is thinnest, there were blisters. The forehead was denuded, deprived of its epidermis; and it was the same on each check and upon the chin. All the burns were of the second degree, vesication, with preservation of all the parts beneath the epidermis; where the epidermis had come away, the external portion of the corpus mucosum seemed everywhere intact.

The patient had no headache, and very little fever, and what was very strange, for a burn of this degree is generally the most painful of all, he suffered very little.

There is a great variety of ways of treating these burns, but in this case, an application of gold-beater's skin was made, which M. Nélaton said he had often seen of great service. It is very simple; it can be left in place, until the cure is completed, without any dressing.

In a few days the patient left the wards, having previously been persuaded, though with great reluctance, to submit to the cutting of his hair.

Cicatrices of a Burn.

February, 1852. A young girl who presented herself in order to be treated for a deformity of the hand; the consequence of the cicatrization of a burn. There was an adhesion of the ring and the middle fingers, extending as far as the joint between the second and the third phalanges. This adhesion existed most toward the back of the fingers, where the skin seemed to be continued directly from the back of the hand, with no depression between them.

Nothing is more difficult than the cure of these cases of deformity resulting from the cicatrization of burns. Even after the separation of the cicatrized parts, they unite again, *their union commencing at the commissure*, and gradually extending until the evil is as bad as it was before the operation.

In order to prevent this, Dieffenbach made use of a flap of skin, which he placed in the commissure, straddling it (*à cheval*) so to speak. Vidal also, before making the separation, by means of a leaden wire, established a hole at the commissure, just as those made for ear-rings in the lobe of the ear. There are different other methods, but none of them often succeed.

In this case, M. Nélaton said that he proposed to act as follows: On the posterior surface of the ring finger, very nearly in the median line, an incision would be made, extending the whole length of the cicatrix, and this would then be met by two others perpendicular to it, drawn at its two extremities; the flap inclosed by these incisions on the dorsal surface of the finger would then be dissected up. The same thing would be done on the middle finger, upon its palmar face. These two flaps would then be so placed, by turning one upon the internal face of the ring finger, and the other upon the external face of the middle finger, that there would be no chance of the two reuniting. The cicatrizing portions would be, one on the back of one finger, the other on the palmar surface of the other, so that not being in contact, they could not unite. By a little reflection it is easy to understand the result obtained by the operation.

Upon examining this patient, however, a day or two afterwards with particular reference to this operation, it was found that the parts were not favorable to it. Another method was therefore adopted; the fingers were separated by a simple incision made, not in the centre between the two fingers, but upon the side of one of them.

In order to prevent the cicatrization from extending from the commissure, a strip of caoutchouc was passed between the fingers, the extremities being fastened before and behind to a bracelet on the wrist. The wound healed, and by the pressure of the elastic band, the union was prevented from extending from the commissure, which it does, although the cicatrization has been perfect there.

The effect of this method of treatment, M. Nélaton said, surpassed all his anticipations. The patient remained in the wards more than a month after the separation of the fingers had been effected, and there was no sign of their again becoming united.

A *cicatrix* results from the deposit between the edges or on the surface of a wound, of a plastic lymph that is condensed, is organized, and becomes fibro-cellular. Of course, the progress of cicatrization differs according as the wound is accompanied with loss of substance and there is suppuration; or, on the contrary, the edges of a wound made by a cutting instrument are immediately reunited; nevertheless, fundamentally, the mode of the formation of the cicatrix is the same.

In the first case, if the wound is not complicated, the hemorrhage soon ceases; for some hours a sero-sanguinolent oozing takes place; then the surface of the wound becomes dry, irregular, and of a pale red color; again, a serous, sanguinolent, slightly viscous fluid oozes forth, that afterwards becomes slightly consistent, yellowish, creamy; it is pus. The wound is covered with small, red, conical granulations, the swelling of the edges by the inflammation is lessened, and they approach the centre of the wound, the extent of which is thus diminished.

These red, conical granulations, by their reunion, constitute a sort of membrane provided with bloodvessels; they have been erroneously stated to be provided with nerves, and to be contractile. They are composed of a large proportion of granular amorphous matter, of fibres of cellular tissue newly formed, of fibro-plastic elements, and of capillaries. They increase in size by the production of new elements, added to those of the same kind already existing, in the whole thickness of their mass, and not only in their depth.

Soon, in place of pus, a very thin whitish layer of coagulable lymph is thrown out from the circumference to the centre; it acquires a true organization, it is abundantly provided with bloodvessels that ramify in a finely granular amorphous matter, a sort of half-solid blastema, in which are also seen fibrillæ of cellular tissue, and some fibro-plastic elements. This layer extends by concentric zones, and when it has reached the centre, *the cicatrix* is formed, but it is feeble and easy to tear. *Cicatrization* is then said to have taken place.

At the same time that this epidermic pellicle is forming, the granulations diminish, which is owing to the disappearance by absorption, molecule by molecule, slow but energetic, of the amorphous matter, and consequently to the drawing close together of the elements having the form of fibres, etc. It is this that determines the retraction and contraction of the edges of the wound, and that has caused belief in the contractility of granulations. The absorption continuing after the cicatrization of the wound, determines the retraction of the cicatrix. At the time when the epidermic pellicle is forming, some elastic fibres are formed, and sometimes some nerves, which are found in cicatrices, and which are added to the elements already pointed out.

When the edges of a wound are immediately united, the cicatrix is only linear, but here also there is plastic exudation of coagulable lymph, and consecutive vascular development.

What is called in this country *cicatricial* tissue, is generally, by the French surgeons, called *inodulaire*, from the Greek word signifying *fibrous*. It scarcely exists in wounds united by first intention; and is the more abundant, as the wound has been more extensive, and in proportion to the length of time that it has continued to suppurate.

It has, at first, the appearance of a reddish cellulo-fibrous layer, but it soon loses its vascularity, and its fibres, directed in all directions, become of a dull white color, which does not have the brilliancy of the aponeuroses, nor the satin-like appearance of the tendons, but whose consistence and hardness can be compared to those of the strongest articular ligaments. Its presence is revealed, in every cicatrix, by the progressive reduction of the surface that has suppurated, reduction that takes place not only during the cicatrization, but that continues when an epidermis has already formed over the whole extent of the solution of continuity. It is this tissue that approaches the edges of wounds, that draws the neighboring parts with force greater than the elasticity of the skin and the muscular contraction, and that sometimes determines those deformities which are observed principally after deep burns, and wounds involving the whole thickness of the derm.

Cicatricial tissue must not be believed to be a special tissue, a tissue everywhere the same; it varies from one organ to another, according to its nature. In the skin, at the expiration of a certain time, cicatricial tissue contains all the elements of the skin, *even the papillæ*, only they are smaller, consequently nearer together, and less regularly disposed. In the tendons, the tissue is first composed of fibres of cellular tissue, mixed with fibroplastic elements; these disappear, to be replaced by those having all the characters of the tendinous, etc. It should always be recollected that *cicatrization* is *regeneration* of the tissues, and therefore it can only be properly studied by having a proper knowledge of their generation.

Contusions.

December, 1851. A man, sixty-four years of age, who had been thrown down by a carriage, the wheel of which passed over the upper and external part of the left thigh; there was contusion, and a quite considerable collection of liquid at that place.

There are four degrees of contusion. The first degree consists in a solution of continuity of the very small bloodvessels of the bruised place, which produces an *infiltration* of blood into the subcutaneous cellular tissue, and sometimes into the interstices of the muscles. In the second degree, vessels of a larger calibre are torn, there is an *effusion* of blood; and, moreover, the muscles are separated from the aponeuroses. In the third degree, there is a profound alteration of the tissues, and consecutive gangrene results. In the fourth degree, there is attrition, complete and immediate disorganization of the tissues.

In this case, the contusion was of the second degree, and the effusion of blood had been quite considerable. When the effusion of blood is but small, it may all disappear in a few days; the elements of the blood separating from each other, are imbibed by the neighboring tissues so as to form an ecchymosis, as in a bruise of the first degree; and they are then gradually absorbed. But, when the quantity of effused blood is large, this infiltration into the neighboring tissues soon becomes impossible, for the walls of the cellular cavity, in which the blood is contained, are not slow in becoming organized, and a membrane develops itself around the sanguineous collection, as around any foreign body. This blood, thus inclosed, either coagulates or remains liquid. When it coagulates, separating into two parts, a serous portion and a coagulum, the former is first absorbed, and finally the fibrinous portion disappears. Sometimes, however, the coagulum disappears, and the serous portion remains; and it may thus remain for an indefinite time, shut up in a cyst, which itself, in certain cases, secretes a fluid, so that the collection of liquid gradually increases. In other cases, on the contrary, it is the fibrinous portion that remains. Finally, the blood shut up in the tissues can become altered, inflame the neighboring tissues, and determine the formation of an abscess, which is then distinguished by the name of *bloody abscess.*

As a general rule, it is best that the effused blood should coagulate, and this coagulation can be recognized by the crepitation, which resembles the breaking of snow when it is trod upon, or that sort of crepitation obtained by pressing between the fingers powdered starch. This crepitation is produced several times until the clot is broken up.

In the treatment of contusions, M. Nélaton said that he had no great confidence in the effect of what are called *resolutives*, the ecchymosis, the pain, and the effusion, all disappear just as quickly without them as when they are used.

In this case, it would be proper to wait before performing any operation, and then if the blood were not absorbed, when the walls surrounding it were well organized and well formed, a puncture would be made to let it out. It was a new idea, M. Nélaton said; but why should not this accidental serous or sanguineous collection be treated as any other serous collection, and, if necessary after the puncture, an injection of iodine be made into the sac? In order, however, to aid as much as possible in the absorption of the liquid, blisters would be applied over the place, and then if it did not take place the puncture would be made. It is desirable to avoid the opening of these collections, when it can be done, on account of the danger of putrid infection.

Blisters were applied several times over the seat of the effusion, and it was all absorbed, so that at one time, at the end of about six weeks, there was no sign of any liquid there. Suspecting, however, that the cure was not complete, that the walls of the sac were not united, M. Nélaton kept the patient in the wards, and after a few days, during which time he walked about as if nothing were the matter, a consecutive collection was formed. The surgeon must never be in a hurry in declaring these cases cured.

The man became tired of remaining, and it was necessary to do something active; a trocar was introduced into the cyst, a serous liquid was evacuated, and afterwards an injection of iodine was thrown in. The effusion following this injection was rapidly absorbed, and the man left the wards, about nine weeks after his entrance, cured.

January, 1852. A young girl, with an effusion of blood, from a contusion, in the right thigh. She struck herself there by a fall into a cellar; it hurt her a good deal, and soon after she perceived a vast ecchymosis; she suffered so much that on the twelfth day she was forced to come to the hospital.

There was an enormous ecchymosis, and in the centre of it a kind of elevation could be perceived, which insensibly confounded itself with the surface of the limb. In this spot fluctuation was very evident, and it could be determined equally well either by placing both hands in the direction of the axis of the limb, or by placing them on opposite sides of it. This is important, for nothing is more easy than to be mistaken in regard to the existence of fluctuation, above all in this part of the thigh. The tensor vaginæ femoris is so arranged as to be easily displaced, and thus it gives a sensation of fluctuation, above all when the limb is slightly flexed. In order not to be deceived, it is necessary to make the aponeurosis tense. All around this collection of liquid was a hard border.

After waiting for a few days, a puncture was made into the collection, and a large quantity of blood was evacuated. The operation was followed by chills and the first symptoms of putrid infection; but by repeatedly emptying the sac, and injecting iodine, these symptoms departed, a healthy suppuration took the place of the first discharge, and the sac gradually closed.

December, 1852. A man was brought to the hospital, a few days after being struck upon the internal part of the leg by a log of wood falling against him. The contusion was one of the third degree; complete disorganization of the skin covering the part struck, had been the consequence. That portion of the integument was dry, with all the characters of an eschar; it resembled exactly a burn of the fourth degree.

In the catastrophe of the 4th of May, 1842, on the Versailles railroad, there were many persons bruised and burned, and M. Nélaton said he had seen Bérard and the most distinguished surgeons, men who had had great experience in such things, hesitate as to whether an injury proceeded from a burn or from a bruise. The fact was mentioned in order to show how difficult it is, in certain cases, to decide.

Wound, Contused. (Water-dressing.)

January, 1852. A young man, with a wound of the heel, caused by the falling upon it of a heavy machine in a printing-establishment. The pressure had been very great; the teguments were cut, as they are by a blunt body, with irregular, fringed edges, as far as the bony tissue of the calcaneum.

The wound was treated by constant irrigation with cold water.

In this treatment, M. Nélaton uses nothing but a simple piece of linen, a conductor of liquid, which adapts itself to all the infractuosities of the limb, and spreads the liquid upon every portion. A small stream of water is made to reach the most elevated part of the linen, from a bucket suspended to the transverse bar, over the bed, to which a cord is attached by which the patients assist themselves in moving. Compresses dipped in water, and then applied, should never be used, because they soon become warm.

In this case, the swelling which had commenced was arrested; the next day the tumefaction was scarcely to be remarked: there was no pain, and when the current of water was interrupted, it showed itself. The surgeon must not be satisfied, in these contused wounds, with the absence of pain and swelling: he must search in the neighborhood for suppuration. The irrigation must be kept up for two, five, or six days; it is a difficult thing to determine the time when it should be interrupted.

This patient recovered without the occurence of any complication.

Wounds from small Shot.

July, 1853. A young man, who had no bed in the hospital, came to ask advice. He had a gunshot wound, inflicted by *shot*, and there is very little to be found in books about such wounds.

These shot wounds, above all when the discharge has been made but a short distance from the person, at a few feet or with the mouth of the weapon touching him, are very alarming. You find pieces of clothing, of flesh, and of clotted blood, presenting a horrible deformity; M. Nélaton said he had often heard the relatives of the patients compare it to a hare-ragout. Yet, as a general rule, these wounds recover very well.

In one case which he had attended, a man, wishing to jump a ditch after a friend who had already crossed, handed him his gun; his friend seizing hold of it awkwardly, the gun went off; the contents struck the arm obliquely, and with the clothing and fleshy parts were driven into the armpit. The humerus in some parts was completely naked, and here and there the nervous cords could be seen. The wadding, clothing, and other foreign bodies were extracted, the parts were placed in their proper position, and in three months the man took his gun and went hunting again.

In another case, a man, who had constructed a most complicated apparatus to preserve his pheasants from poachers, one fine morning forgot his trap, and received the whole load of fine shot, at a distance of about three feet, in the external part of the thigh. There was such laceration of the soft parts that the femur was exposed, and yet in a short time the man got perfectly well.

These loads are driven as far as the bones, but they do not fracture them; that is, unless a shot larger than No. 5 be used, the bones are not broken. When these wounds are not upon an important organ they are not generally serious, even when the bone is denuded. The pistol by which this young man had been hurt, had been charged with very fine shot, No. 10. In trying to hang it up, it went off, and the load was received when the muzzle was almost against his hand. The same day thirty shot were removed, the next day twelve, and while in the hospital, M. Nélaton removed four more. He used for that purpose a wire, doubled upon itself so as to form a loop, and then twisted, to make a handle of some firmness. The wound made by the discharge was circular, about an inch in diameter, and situated in the median line, just above a line drawn transversely across the hand from the commissure of the thumb. It was not impossible that the superficial palmar arch had been wounded. At the time of the accident, three wineglassfuls of blood had been lost.

When the patient left, he was enjoined to take care, on account of the danger of secondary hemorrhage, of making any efforts, and above all *of straining at stool.* M. Nélaton said the class would be astonished to find how often the hemorrhage in such cases takes place during defecation.

Wound of the Hand. (Hemorrhage.)

March, 1852. A young man, in working, had driven the instrument he was using, a chisel, into the palm of his left hand. There was a copious flow of blood from the wound, and he went to an apothecary, who applied some hemostatic wash, by which it was arrested; not satisfied, however, he went to Val-de-Grace, where a piece of diachylon was applied. The next morning—it was on Wednesday, in the evening, that the accident happened—after making a sudden movement, the hemorrhage recommenced; after a short time it stopped without any application being made. On Friday the same thing occurred, and also on Saturday afternoon, about five o'clock, when the hemorrhage was so great that the patient entered the hospital.

The wound was situated in the palm of the hand, near the middle, and was one and a half inch in extent. An apparatus was applied by means of bandages, so as to exert pressure at the same time upon the wound, and also over the course of the radial and the ulnar arteries. The two rollers placed upon the arteries were prevented from being brought together by the bandage wrapped around the arm, by means of a third of much greater thickness placed between and upon them. The circular bandage, which approximated them, in this way also separated them, by forcing this third roller, as a wedge, between them. This apparatus succeeded in arresting the bleeding.

After a wound of the hand, ligatures should at once be applied to both extremities of the wounded vessel. If it be too late, the apparatus just mentioned should be applied; sometimes, however, this does not arrest the hemorrhage. In a consecutive hemorrhage, the method of Anel (or of Hunter) must be proscribed; it cannot be relied upon, and, morever, there is a measure much more simple, namely, the ligature of the two ends of the divided artery. It may occur, however, that you may be *compelled* to apply the method of Anel, or the ligature of the vessel at a distance from the seat of its injury.

In applying the ligature, the surgeon must not be restrained by the fact that the extremity of the vessel is inflamed; the ligature falls a little sooner on that account, but that makes no difference, the external coat of the artery is not divided by the thread. In one case where it was impossible to find the end of the artery, the deep palmar arch having been divided, M. Nélaton had used the actual cautery, and the success was most satisfactory. In those cases, then, when the ends of the divided vessel cannot be found, he gave it as his advice to cauterize the parts from which the blood proceeds.

In 1850, M. Nélaton read a paper to the Academy of Medicine, on the *treatment of consecutive arterial hemorrhage;* the following are his conclusions:—

1. The mechanism of the spontaneous obliteration of arteries on the surface of a suppurating wound, differs essentially from that presiding over the obliteration of these vessels in a recent wound. The word occlusion is suited to the first, that of obliteration to the second.

2. This occlusion consists essentially in the adhesion of the fleshy granulations that develop themselves in the cellular sheath of the artery after its retraction, as they are developed on every other point of the solution of continuity.

3. The ligature by Anel's method can indeed lead to the definite suspension of a secondary hemorrhage, but on condition of its interrupting the course of the blood in the divided vessel until the time when the fleshy granulations have united intimately enough to resist the impulse of the blood carried below the ligature by the collateral branches.

4. If the arterial wound be situated in a region where the anastomoses permit the circulation to rapidly resume its course, as, for instance, in the hand, the foot, or the neck, the return of the hemorrhage after the application of Anel's method is almost inevitable, if any cause whatever, local or general, occurs to retard the process of cicatrization.

5. The ligature of an artery can be made in a suppurating wound, without danger of the immediate section of the vessel, or of the premature falling of the ligature.

6. This ligature determines the obliteration of the vessel as surely as when it is practised in a fresh wound; it must, therefore, have the preference over the method of Anel, every time that it is possible to practise it.

Anthrax.

April, 1852. A woman, rather advanced in life, who presented a quite curious affection of the breast. Her health had always been good. For twenty years she had had a tumor, situated in the neighborhood of the left axilla; this tumor was movable, and did not incommode her in the least, until about one month before coming to the hospital, when a pathological action commenced to take place. At the time she entered, towards the external part of the left breast there was a tumor the size of the fist, and quite regularly rounded. The integuments covering this mass were adherent to it; the skin was red and smooth, and presented all the characters of a skin invaded by intense inflammation; there were several openings through which a small quantity of pus issued.

There were two questions here to be asked: What was the original tumor? and, what had taken place recently? The indolent tumor could have been but an encysted lipoma; and this at last had become inflamed. This inflammation might have been primitive, and it might have followed an inflammation previously existing in the subcutaneous cellular tissue. It was very possible that an anthrax had become developed precisely over the place where the tumor was situated, and its inflammation had been consecutive.

In the treatment of the case, antiphlogistics, narcotics and mild purgatives would be employed. An incision would not be made into the anthrax, because that does not shorten the duration of the healing, but, on the contrary, it lengthens it. Let an anthrax alone, there will be openings formed, pus and the core (*bourbillon*) will come out, and after that it will heal; but if you make incisions into it, the edges of the incisions will separate very widely, and the healing process will be very long. It must not be imagined that the incisions relieve a strangulation; this strangulation of which writers speak, is, to say the least, doubtful, and that which is doubtful in theory is still more doubtful in practice. Suppose that an anthrax was formed by the inflammation of a number of the small fatty masses contained in the areolæ of the derm; a crucial incision would open but a very small number of them; you could not relieve the strangulation in all of them without making incisions in all directions. This is what theory would say, and M. Nélaton said he declared most positively, that practice showed that the only effect of incisions was to delay the cure.

In the treatment of furuncle, which differs from anthrax solely in its size, the disease being confined to a smaller number of the small fatty masses,[1] M. Nélaton believes you can sometimes succeed in putting a stop to them by the application of concentrated alcohol.

December, 1853. A case of anthrax came into the wards, and M. Nélaton took the occasion of rectifying opinions he had formerly taught.

A man, about fifty years of age, whose case is mentioned also under the head of urinary fistulæ, entered the wards with a small sore, the size of a ten cent piece, situated on the back part of the leg; the adjacent parts were tumefied, red, and œdematous, and there was an odor of excessive fetidity about the man, that seemed to have its origin in this sore. Pus of a bad character came from the opening, and the neighboring tissues were detached, so that the probe could be introduced to a great distance around; it seemed, however, as if this detachment was only between the skin and some cellular tissue, it was not beneath the aponeurosis. The excessive fetidity of the odor from the patient was owing to putrid tissue. A large opening was made to let it out, and the parts were thoroughly wiped with linen to extract all that was gangrenous.

The patient said that fourteen days before, he had noticed a small pimple developing itself on the external portion of the limb; it became larger, and excited a redness in the neighboring parts, but the *interne* at the Hospital of St. Marguérite, to whom he showed it, told him it was nothing; it became worse, however, and he entered M. Nélaton's wards.

A furuncle or an anthrax of small dimensions can give rise to a diffused phlegmon, worse than the original affection. M. Nélaton formerly taught that an anthrax would not cause strangulation of the tissues, and this is true, for the tumor extends under the skin, and is rather subcutaneous than cutaneous; the cavity is not at all so disposed as to undergo strangulation. What is called the core is not an eschar, but a simple product of secretion, a false membrance which has been formed. On this account he had said that incisions were not useful, for anthrax being an inflammation characterized by the secretion of an albuminous liquid, that becomes hardened, incisions most assuredly could not put a stop to this inflammation and the pseudomembranous effusion which follows it. On the contrary, the knife would be a source of violent irritation, both during the operation by the pain it causes, and also by the contact of air or other foreign bodies with the edges of the wound. But, in a certain number of cases, anthrax can become the cause of a diffused phlegmon, and the surgeon should always examine in its neighborhood, and if there be signs of it, he must not hesitate to make incisions. This patient had entered with the consequences of such a complication, the gangrene of the subcutaneous cellular tissue.

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[1] These affections consist in the inflammation of one, in furuncle, and of several, in anthrax, of the prolongations which the subcutaneous cellular tissue sends into the fibrous areolæ of the derm, to accompany the vessels and the nerves which go from the deep-seated to the superficial surface of the derm. They both terminate by the formation and elimination of a *core* formed by the inflamed cellular tissue, which is mortified.

Flaxseed poultices were applied to the sore part, and it continued doing well until the tenth day after his admission, when in the evening he had a very severe chill, that lasted for two hours, and was followed by great heat of the skin and headache, without any subsequent perspiration; at the same time, the patient complained of his leg. The sore then had lost its good appearance, it was ecchymosed and the suppuration was serous; the smallest touch upon it excited pain. At the upper angle was a small point, more elevated than the rest, and of a slightly rosy color; when touched, the sensibility of this point was most remarkable. When this was found, the course of the lymphatic vessels was explored; just by the spine of the tibia, it was perhaps too tender, but no cord could be felt upon the leg; upon the thigh, however, a hard cord was easily recognized by the touch, extending to the subinguinal or crural region, where there was a large mass of lymphatics. The swelling at the upper part of the wound, the hard cord upon the thigh, the increased sensibility, and the increased size and painfulness of the ganglions indicated an inflammation of the lymphatics, an angeioleucitis. Blandin considered erysipelas to be an inflammation of the lymphatics of the skin.

Angeioleucitis is not generally a serious affection, and patients recover without difficulty; it very rarely becomes complicated. It is not so, however, with erysipelas; this is as erious affection. Many medicaments have been employed to stop its progress: the sulphate of iron, M. Nélaton said, sometimes had appeared to him to exert some favorable action; collodion, he had undoubtedly seen to stop it, but it also often fails; belladonna, and in short everything thus used he had employed, but—and M. Velpeau only a few days before in private conversation had told him the same thing—he placed very little confidence in any of them. He said, he remembered that Dupuytren used to apply a blister in the centre of the erysipelas, and he would try it here; Dupuytren never abandoned the practice, and he was not a man to persist in following a useless method. The day after the blister had been applied, the erysipelas had progressed beyond it; as to the part covered by the blister, of course, no judgment could be formed; a second, and a third blister were applied, but they failed completely in arresting the affection. There were, however, some complications in this case, which may have had their influence, and which are mentioned under the head of Urinary Fistula.

Malignant Pustule.

March, 1854. A man, fifty-two years of age, a turner of metals; he also turned horns, and these he received fresh from the animals, and worked and prepared them himself.

Twenty-one days before, after washing and cleaning a number of horns during the day, when he returned home in the evening one of his children asked him what was the matter with his eye, and upon looking in a glass he found the lower lid to be enlarged, and to have a small pimple developed upon it. He pulled away this pimple, but it became larger and larger, and, becoming alarmed, he consulted a physician, who cauterized it with nitric acid three several times on three successive days. These, in a few words, are the details given by the patient himself, about his affection, of the nature of which there could be no doubt: it was a malignant pustule; a slight œdema with a pimple, as if from the bite of a flea; a vesicle formed which was broken, and the point dried and become brown, and this brown point depressed below the surrounding parts from their great swelling. The patient had not noticed a circle of small vesicles placed around this central nucleus, and called the areola. To say that the swelling, in this case, was considerable, would give no idea of what it really was; the whole of the left side of the face, of the neck, anteriorly and posteriorly, and of the upper half of the chest, was swollen.

Such a swelling, M. Nélaton said, was not extraordinary, and he related several cases to show this. When a surgeon of the Bureau Central, he was supplying the place of Bérard, at the Hospital Necker, when a *chiffonnier* came to the consultation with his neck enormously swollen: it was thought to be a submaxillary phlegmon, and as the interior of the mouth was very red, it was thought it would open there. This was at 10 o'clock in the morning, and at 3 o'clock in the afternoon he had been sent for to see the patient, who was dying. Going in haste, he found that the swelling had increased, and the signs of asphyxia were so great that the trachea was opened to relieve the difficulty of breathing; in seven or eight hours afterwards the man died. Seeking a reason for the enormous swelling, and examining the beard, the long and neglected beard of a *chiffonnier*, he found a malignant pustule of the most marked character. If he had examined the patient, as he ought to have done, M. Nélaton said, this pustule would have been discovered and cauterized, and the man would have recovered. Upon another occasion, a surgeon informed him that he had lost a patient, twenty-four hours after his entrance to the hospital, from a panaris. When he went to examine the body, he found upon the wrist a magnificent malignant pustule, and the huge swelling extending from it.

There is a disease which, at the commencement, is very simple, which belongs, equally with this other, to the charbonnous affections; in it, there is at first only swelling of the eyelids, without pustule. The physician must interrogate, and see if the patient has not been handling animals or animal matters; for, in order to give rise to this disease, it is not necessary that the animal be living, the dead matter preserves its properties. M. Nélaton has seen skins that preserved this property; one, the skin of a hare, after washing and much handling. This form of charbonnous disease was described by M. Bourgeois, a physician of Etampes, who calls it *malignant œdema of the eyelids.*

In this case, the patient had been cauterized, as was said before, by nitric acid, that had extended itself over the cheek, and a very large destruction of tissue had taken place. It had been applied three times, on three successive days, in place of which the surgeon should have made use of the actual cautery, one good, energetic application of which would have been sufficient. The cauterization here, it was true, had saved the man's life, but it might have been done in a preferable way.

There was nothing particular in the subsequent treatment in this case; the patient remained more than a month in the wards, gradually and slowly improving; the loss of substance from the applications of nitric acid had been very great, and a long time would be required to supply it.

Farcy.

March, 1852. A man, fifty-one years of age, entered the wards affected with a considerable number of cold abscesses in various parts of his body. He was a coachman, and, with a doubt as to whether the affection might not have been caught from diseased horses, his profession was dwelt upon; but the man always answered that he never entered the stables, and that he never cleaned the horses.

Five years before, he had been attacked by an eruption; a great number of large pimples appeared in succession over every part of his body.

The man was thin, feeble, and downcast, and with these purulent collections in different parts of his body. He suffered no pain anywhere.

These collections, at first, were thought to be simply cold abscesses; but M. Nélaton became more and more persuaded of the truth of the question that had preoccupied him when the man first entered, namely, that they were farcinous. An inoculation of the pus was made upon an ass with the desire of settling the question, but it gave a negative result; the animal was not affected by it.

These abscesses were cured at once by puncture, which gave issue to a serous pus, containing some few flakes, resembling that commonly called scrofulous. They formed with wonderful rapidity; for instance, on Monday there would not be a trace of one in a certain part of the body; on Tuesday one would be found, and it would be cured by a puncture; on Wednesday there would be two in the neighborhood. This was a most remarkable circumstance.

Other inoculations were afterwards made, and always with the same negative result. M. Nélaton, however, was *almost* certain that the affection was chronic farcy.

This patient at last died, exhausted by this successive formation of abscesses in nearly every part of the body.

Glanders.

On the first of March, 1854, a very interesting case entered the wards as one of *double lachrymal fistulæ.* The patient was a young man, twenty-two years of age, and of ordinary constitution. There were two lachrymal fistulæ, one on each side, the ulcerated opening placed, as it usually is, under the direct tendon of the orbicularis muscle.

This fact alone, the existence of two fistulæ, with ulceration around them, in a young man who had no signs of scrofulous diathesis, was of itself, M. Nélaton said, almost sufficient to tell what it was; it was undoubtedly a syphilitic affection.

When questioned, the patient said that he had never had anything upon his penis—that there never had been a pimple or an ulceration there; at last, however, he said that about one year before he had had an eruption (he called it a *gâle*—or the itch) upon the trunk of his body, upon his extremities, the side of extension, as well as of flexion, being affected, and also upon his penis. At the same time, his sister, his father, and his mother had the same eruption. An apothecary gave him an ointment to cure this eruption, and it required to be used for nine months.

Now the itch is generally cured by the *ointment of Helmerich,*[1] which, from the description of the patient, was the one employed in this case, in from nine to twelve days; and M. Nélaton said that he was strongly inclined to believe that the eruption had been syphilitic.

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[1] This ointment, which, after many trials, M. Cazenave prefers to any other in the treatment of itch, and which Biett employed almost exclusively, is composed of: Sublimed sulphur, two parts; subcarbonate of potash, one part; lard, eight parts. As a speedy cure, it is preferable to every other ointment; but it has the disadvantage of leaving spots upon the clothing with which it comes in contact, that cannot be removed.

Six months before coming to the hospital, a small pimple had formed near the inner angle of the left eye; it opened, some pus issued, and the opening had never closed; six weeks afterward, the same thing took place at the right eye. In addition to the fistulæ, there was quite a notable deformity of the root of the nose; from the tumefaction of the parts, at the sides it appeared flattened. Sometimes when the patient would blow his nose, some blood would issue. Beside the condition of the nose, there were ulcerations upon the palate, some entirely through it, and others not, having perfectly the syphilitic aspect.

Incomplete as the case was, there was sufficient, M. Nélaton said, to diagnose a tertiary syphilis.

Seeking to determine the condition of the bones, M. Nélaton could not detect any necrosis; he could not come upon any naked bone, yet he considered them to have been the *point de départ* of the condition of the part; for, when the ascending processes of the upper maxillaries were examined by the touch, it could be felt that there was osteitis, or, at least, a tumefaction of the periosteum. The nasal bones were healthy. When the patient was made to blow his nose, air escaped through the ulcerated openings; it is true that under such circumstances it might pass without entering the lachrymal passages, but assurance was had of its entering them in this case, for probes passed through the fistulæ went directly into the lachrymal canal.

In the treatment of this case, M. Nélaton said the tertiary symptoms of syphilis were to be dealt with, and the effect of the iodide of potassium upon them is wonderful; in four or five days the cure would be rapidly progressing. If the iodide alone was not sufficient, it would be given with mercury, and the bottom of the throat would be cauterized. So far as the palate was concerned, that would all heal up, but it was very probable that in the lachrymal passages some parts would be stopped up by the cicatrization. If anything defective resulted, an endeavor would be made afterwards to remedy it.

For some time this treatment was carried on, but with no effect upon the ulcerations; instead of seeing those in the palate cured in ten days, and the condition of the others greatly ameliorated, they gradually, though very slowly, became worse. Toward the end of the month, the young man had large serous discharges from the bowels, which for some time could not be arrested; it is curious, but they ceased at once after a vomit of ipecacuanha.

At that time, M. Nélaton said frankly he did not consider the case syphilitic. He gave again its history. In the month of September, when in perfect health, the patient had pain in the left eye, at the inner angle, and eight days afterwards a tumor was formed there. But, what he had said nothing of when first examined, the patient said that, for two months previously to the appearance of the tumor, a very abundant secretion from the nose had existed, which, he said, was different from any *cold in the head* he had ever had. Six weeks afterward, the same thing took place in the other eye. All this time, his appetite continued excellent. He went to La Charité, when M. Giraldès saw him; something very simple was done, and he soon left the wards with the assurance that he would get well of himself.

But, what had not been known at his entrance, this young man had been taking care of horses some time before, and one of them was sick and *concealed*.[1]

It was a question whether the affection under which he was laboring had been contracted from this diseased animal. It was then fourteen months since he had left off attending to horses, and his affection having commenced but six months before, that would make eight months to have elapsed before any manifestation of the disease. This was certainly a very long time. However, it is unknown how long glanders can thus remain in the system; there was doubt upon the affection, and the patient would be retained in the wards to elucidate the question. As to the treatment, the ulcerations were acted upon by nitrate of silver and by tincture of iodine; internally, quinine, strong wine, and brandy were given.

The patient became steadily and slowly worse; in the beginning of May he was exceedingly prostrate, and evidently could have lasted but little longer. There was no doubt then, M. Nélaton said, about the case, his original diagnosis had been erroneous; it was one of *chronic glanders*.[2]

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[1] In France, horses affected with glanders are killed by the authorities.

[2] In connection with this case, on account of the mistake in its diagnosis made by M. Nélaton, it is worth while to notice that Ricord is of opinion that the great epidemic that burst out in Europe, at the close of the fifteenth century, or about the

The identity of farcy and of glanders has been much disputed. Both affections may complicate each other; they are both contagious, but inoculated, they give rise to an affection resembling the one by which the communicated products were furnished.

In farcy, there is inflammation followed by suppuration of the lymphatic vessels and ganglions; the pituitary membrane may be attacked, by which some resemblance with glanders is established.

Glanders commences with inflammation of the mucous membranes, and the fact is that this disease has a special manifestation in the pituitary membrane. There is a discharge of mucus from the nostrils, with thickening, induration, and ulceration of the mucous membrane.

Both farcy and glanders can be either acute or chronic; and both are contagious, not only in the acute form, which every one admits, but also in the chronic. A great number of cases of chronic glanders in men have been traced to chronic glanders in horses.

Farcy is observed in horses, sometimes in oxen, rarely in asses and mules, and never in carnivorous animals. It would perhaps have been better to have inoculated a horse, rather than an ass, in order to test the character of the pus, furnished by the abscesses in the first case.

Glanders has never been seen but in animals of the same family with the horse; animals with cloven feet, so far as is known, are exempt from it. If the animal species be separated ever so little from that of the individual infected, the transmission of an inoculable disease may not take place, or at least the form of the transmitted disease will be changed in case it does take place.

Inoculable diseases have been defined to be "those in which the fundamental organic substance, or substances of a single humor, or of all the humors, have undergone a modification or a

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time of the discovery of America, was one of acute glanders or of farcy. He says: "The mode in which the symptoms were transmitted, their gravity, the predominance of the constitutional infection over the local phenomena, which were absent or passed unnoticed, all appear to me to resemble much more what is known at the present day of acute glanders or of farcy than syphilis." "*How many men*," he adds, "*with glanders and farcy must have been, and have been taken for syphilitic;*" a remark the value of which is apparent after the perusal of the preceding case. (See *Ricord's Letters on Syphilis*, the tenth letter.)

change of specific condition, which they transmit to the organic substances, and consequently to the organized substances of every other living being." They transmit this condition in virtue of that property possessed by every organic substance of determining, by simple contact with healthy substances of the same or of a different kind, the same mode of alteration it has undergone itself. Even *the smallest quantity* can do this, for the modification takes place gradually, step by step, molecule by molecule. As to the formation of the virus, it is the same phenomenon as that which takes place for the formation of the organic substances themselves by isomeric catalysis, and the transmission, by simple contact of this property, permits all the phases to be rationally understood. Modified by an unknown cause, transformed into a substance to which the name of *virus* has been given, one of these organic substances itself, passing to another specific condition, has the property of transmitting this acquired modification to all the principles, identical or analagous with it, with which it comes in contact.

In the *Archives Générales* for 1851, there is a case of chronic farcy, with probable cure, reported by Adolphe Richard: it can be consulted with profit by those curious in this most interesting disease; one, the proper study of which, it may be hoped, will lead to the understanding of all diseases transmissible by inoculation.

In the *Archives Générales*, for 1841, is the celebrated memoir of Tardieu, on Chronic Glanders.

Spontaneous Gangrene.

November, 1852. An old man, sixty-seven years of age, who had the appearance of a good constitution: he was an *ouvrier mécanicien*, a calling requiring physical strength. Six weeks before coming to the hospital, he had the first symptoms of the disease under which he was laboring; it commenced by pain in the little toe of the right foot, the pain being moderate; at the same time he remarked a livid tint and a slight swelling: all this came without any appreciable cause.

When the man entered, the toe was of its normal size; there was as yet no mark of elimination; the gangrene seemed to extend as far as the second phalanx.

This was the disease called formerly senile gangrene, but now, more properly, spontaneous gangrene, for it shows itself sometimes in adults and even in children. The causes of the affection have almost all relation to an obstruction of the circulation; in some cases it is determined by an arteritis; here, there were no signs of it; sometimes it is owing to ossification, here all the arteries had their walls perfectly supple. Nothing could be detected on the part of the veins; when they are at fault, the first thing to be seen is an œdema, here there was none; there was no tumor in the iliac fossa, nor in the groin; the man had not been wearing any bandage. At the heart there were no abnormal sounds; in regard to the influence of this cause, some authors think that an abnormal condition of that organ, capable of bringing about a disorder of the circulation so great as to cause a gangrene of the extremities, is incompatible with life; an affection of the heart produces œdema of the inferior extremities, and the œdema is the cause of the gangrene; the affection of the heart produces the gangrene always through the medium of œdema. Hygienic causes have been given; Pott has given it as his opinion that it was a disease of the rich, but this was because his practice was among the rich; it is every day to be seen in hospitals, in persons who have been badly nourished; when at Bicêtre, M. Nélaton had seen a great number of cases, and he was disposed to attribute considerable influence in the production of the affection to insufficient alimentation; not that they were not sufficiently fed in that hospital, but that the patients were unable to profit by what they ate.[1]

In the treatment of the affection, M. Nélaton said that he was not at all disposed to practise an operation; he believed the best plan would be to wait, and to limit himself to topical applications to relieve the pain. The patient remained a long time in the wards; the gangrenous portion of the toe at last came away, between the first and the second phalanges, and the man left well.

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[1] Bicêtre is used as an asylum for indigent old men, and male lunatics. The indigent and infirm old men are obliged to work three hours a day, and receive in return a share of the profits; their daily allowance is a portion of soup, a pound and a quarter of bread, four ounces of meat for dinner, vegetables or cheese at night, and a quarter of a pint of wine. The lunatics, idiots, and epileptics, nine hundred in number, receive in general the same allowance as the paupers, excepting of bread, of which they receive a larger quantity.

Neurotic Tumors. (*Névromes.*)

December, 1851. A young man died in the wards, who had tumors, painful to the touch, of various sizes, in every part of the body. They were situated in the track of almost all the nerves, and some were as large as a small chicken-egg. The position of the patient, while living, was one of contraction of almost all the muscles of the body. M. Nélaton had considered them to be *névromes*, and, at the examination of the body, they were found to be so. It was impossible to find one nerve, without one of the tumors—which were formed of a tissue, hard, grayish, and resembling fibro-cartilage—developed upon it.

In the museum of Clamart, there is another similar case, but that patient was one who died of typhoid fever, and the neuromata were found accidentally at the *post-mortem;* the man had never suffered from them.

In Dupuytren's museum there is a body, all the nerves of which have fibrous tumors developed upon them. This patient died of asphyxia, by the compression exerted by those developed upon the pneumogastric nerve. In his case they had been removed in different parts of the body, but they always returned in other parts.

Neuromata are generally hard, fibrous tumors, as in the present instance, or fibro-plastic tumors, when they are more soft. They separate the nervous filaments from each other, compressing them and interfering with the movements. They rarely produce atrophy of the nervous tubes, which are preserved by the perineurion covering their primitive fasciculi.

Hypochondriasis.

April, 1853. A man about forty years of age, a peasant from the country, who had previously presented himself to M. Nélaton at his residence, on account of great pains at the anus. He had told him that his disease was owing to his having been *touched* by a dog, and confessed to having committed some beastliness with the animal, whose penis had entered the anus. The first time it was done, great pain at the anus was the consequence, which disappeared after the application of leeches; the dog had been with him again, and the pain had returned. The cause to which the man attributed the pain, M. Nélaton said, he did not believe himself to be the true one; but the man was hypochondriac, and it was best to appear to enter into his views of the case; it was very certain that he had neuralgic pains at the anus, and the proper treatment for them was to be sought.

A general treatment adapted to a neuralgic affection would not be sufficient in such a case as this, and it was proposed to cauterize the margin of the anus with the actual cautery; this could do no harm, but it would act upon the imagination, and such a cauterization is very beneficial in neuralgias. The surgeon should not refuse to employ these little deceits, when they are for the benefit of the patient. A man came once to M. Velpeau with a snake in his stomach, which he had vainly sought to have extracted by many surgeons, who had only attempted to reason him out of his belief; M. Velpeau pretended to fully agree with the man in his conviction, admitted him to his wards in La Charité, and one day after properly arranging the man, made a superficial incision over the stomach, and then produced a snake, which he had previously got ready; the man went away afterwards perfectly well. A very curious story was told by M. Orfila, of the truth of which there could be no doubt; one day when seated in his study, a Persian, who was known afterwards to have been a person of high distinction, introduced himself, and told him that, after many unsuccessful attempts in his own country, he had come to Paris to have one of his two noses removed. M. Orfila heard him without expressing any astonishment, and told him to come the next day; in the mean time, he procured a nose at the Ecole Pratique[1]; when his patient came, he gave him chloroform, made an incision at the side of the nose, and when he awoke showed him his amputated nose; the Persian returned to his own country, delighted with Parisian skill. Far from being wrong, it is the duty of the physician to lend himself to such deceits (*supercheries*), for it is the only way of curing his patient.

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[1] The Ecole Pratique and Clamart are the two places for dissection in Paris.

One application of the actual cautery was sufficient to relieve this patient of his neuralgia.

Spina Bifida.

May, 1854. A child but a few weeks old, after having first been shown to M. Dubois (who has obstetrical wards in the same hospital), was brought to M. Nélaton to be operated upon for spina bifida. The tumor in this case was about the size of a chicken-egg, and it was pediculated; as a general rule, the base of these tumors is larger than the other parts, but in this instance it was more narrow, so as to form a kind of pedicle.

Every one must be acquainted with the manner in which the vertebral column is formed; for a long time there is an opening posteriorly, which is closed from above downwards, so that the first arches that are united are those in the cervical region. When there is an arrest of development, the arches do not unite, and the membranes remaining without protection, project and form a tumor. In some cases, a portion of the spinal marrow is found in the tumor; here it was not so.

This case was one, M. Nélaton thought, suitable for an operation. A great many methods of treating these tumors have been employed; but of late, the practice of treating serous cavities by puncture and injections of iodine has been introduced, and this should be tried in this case, in the hope of producing the obliteration of the cavity. If the operation prove successful, the opening in the vertebral column is closed by cicatricial fibrous tissue.

In performing this operation, the liquid used as injection must be prevented from flowing into the cavity of the rachis. It was very easy, in this case, to close the communication between the two cavities, by seizing the pedicle between two fingers, and then pressing them together by the other hand. This, it was supposed, would answer, for the science of surgery possesses analogous facts; for instance, congenital hydrocele has often been treated by injection, and the liquid thrown into the sac prevented from passing into the large peritoneal cavity, by a bandage. M. Nélaton said he was not acquainted with a surgeon in large practice who had not performed this, and what is strange, it had been brought before the profession, as a novelty, only fifteen days before. M. Nélaton himself thought the liquid effused from the surface of the sac after its inflammation, might irritate and cause inflammation of the whole rachidian membrane, if it were allowed to come in contact with it; but, M. Dubois not partaking of his fears, it was decided to open again the communication, after the injection had been made to come out. If, in this case, it should be found to do harm, in a subsequent one, a ring of caoutchouc could be used around the pedicle, in order to close the passage.

This operation was performed upon the last morning I was able to visit the hospital, and I have not been able to learn the result.

Stricture of the Œsophagus.

January, 1853. A man, about thirty years of age, came into the wards with an affection so curious and so important, that the whole attention of the class was drawn to it. The patient related that a year before, a tumor formed in the right submaxillary region; it appeared to contain a fluid, and with that opinion, it was opened by a physician by the application of caustic potash. A quantity of pus issued, and it continued to come away for two months, gradually changing to a simple fistula. Some time afterwards a tumor appeared on the left side, externally to the clavicular fasciculus of the sterno-mastoid muscle; the skin by degrees became thin and red, the patient opened it with his knife, and, to his astonishment, very little pus came away, but a jet of gas issued.

From the time this tumor had formed, there had been difficulty in swallowing; upon trial, liquids passed with ease, and also bread in very small fragments, but there was a great deal of trouble with a piece of tough meat; the patient felt it arrested, and after most singular movements, got rid of it by vomiting. A bougie was introduced into the œsophagus, and although the ball at the extremity was not very large, it was arrested, and by pressing, a resistance was felt to be overcome. By pushing the hand between the sterno-mastoid muscle and the vertebral column, the tumor was readily perceived, and, what is important—for all that has hitherto been said would come equally well from a tumor situated in the immediate neighborhood—when the patient was made to execute the movements of deglutition, they were all executed by the tumor; this, therefore, was developed in the walls of the œsophagus—it was a thickening of those walls.

There was not supposed to be any physical connection between the first tumor, that had been formed on the right side of the neck, and this one; had there been, both would have been formed on the same side.

From whence came the air that had escaped from this opening? It might be from the lungs, for tuberculous masses in these organs have been known to soften and open in this region; here, however, there were no symptoms of tubercular deposit in the chest. It might be from the trachea, after perforation, in a deep-seated abscess of the neck; cases have been met with where such abscesses have opened into the air-passages, but never without having been preceded by dreadful symptoms of suffocation. M. Nélaton thought that in this case it came from the œsophagus; he thought there had been an ulceration in that canal, and that some food, and air (which is swallowed in deglutition) had passed into it. As there was at that time a lesion of the œsophagus, it corroborated this opinion. A white swelling of the cervical vertebræ was thought of, for one of the first symptoms of this affection is difficulty of deglutition, but there was no osseous tumor, and all the movements of the neck were executed with the usual facility. The patient was questioned as to syphilis, for the cause determining an ulceration of the pharynx could very well determine one a few centimetres lower down in the œsophagus. There was nothing in the answers of the patient to encourage the idea of syphilis having anything to do with his affection. It is a curious fact that strictures of the œsophagus are always—the *always* of surgical pathology—situated very near the upper part of the sternum.

The treatment of the case should consist in endeavoring to dilate the stricture of the œsophagus. This it is difficult to accomplish, for you cannot allow bougies to remain in that canal as you can in that of the urethra. They should, however, be introduced, and the patient should be desired to retain them as long as possible.

Every day an olive-shaped piece of ivory, the size of which was gradually increased, attached to a stem, was introduced past the stricture. In order to facilitate its introduction, it was previously coated with the white of egg. By this means the stricture in the canal was dilated, so that at the expiration of two months, the man left apparently cured of that affection; the fistulous opening in the neck, however, still remained.

In March, 1854, this patient returned to the wards; he was then in a most miserable state from the difficulty experienced in deglutition, and died a few days afterwards in consequence of it. At the examination of the body, the lungs were found filled with tubercles; there was a stricture of the œsophagus, and just above it a hole, through which a probe could be passed to come out at the external fistulous orifice in the neck. Just where this stricture was placed, alongside of the larynx, a large mass of tubercle existed; this had softened and opened a passage, both externally and into the œsophagus.

M. Nélaton said that if the stricture of the œsophagus in this case had not co-existed with tubercles in the lungs, an operation could have been performed for its relief. The œsophagus can be opened just above the stricture, and it can be cauterized, or tubes can be introduced until it is cured. As a last resource in these cases, the operation of M. Sedillot, of Strasbourg, can be performed; for death advances slowly and surely day after day, and the patient may be, in other respects, robust and in perfect health. This surgeon, the œsophagus being closed, opened the abdomen, and through the orifice thus formed into the stomach, nourishing liquids were injected.[1] This operation is justified by some cases,

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[1] M. Sedillot has performed this operation twice. The first time he made a crucial incision, through the integuments, the rectus muscle, and the peritoneum, and holding back the four flaps, by the aid of the superficial and upper layers of the epiploon, he drew out a portion of the great curvature of the stomach, and making a puncture into it, he introduced a double canula, each tube having a projecting edge bent at a right angle, in order to keep the stomach against the walls of the abdomen, and also to retain the instrument at the external wound. Almost immediately, however, the stomach was drawn forcibly backwards; the canula followed, and was dragged into the abdomen; the patient died in twenty-one hours.

M. Sedillot performed *gastrotomy*, as he calls it, a second time, in 1853. He modified his first proceeding; the incision was made at two finger-breadths from the median line to less than an inch from the edge of the false ribs of the left side. After opening the peritoneum, the stomach was drawn up and fastened to the ab-as for instance the famous one of the Canadian of Dr. Beaumont; if a wound inflicted with no precaution could thus terminate, why should the surgeon not try what he can do, in cases otherwise surely fatal.

Foreign Body in the Œsophagus.

February, 1854. A woman, thirty-five years of age, who two and a half months before, while eating soup, felt something arrested in the œsophagus. The soup was made from mutton, and the patient was sure that a small bone had stopped at the upper part of the alimentary canal, and was still there. At the time of her entrance into the hospital, she said that she felt it at the lower part of the neck; at other times she had felt it in other positions. She had consulted many surgeons, and a bougie had been frequently introduced, by which means the bone, she said, had been several times displaced.

This woman was very nervous, and confessed to having had hysterical attacks; she had the *hysterical ball*, and at the same time convulsive movements of the limbs, with preservation of the intelligence. The affection for which she had come to be treated was no doubt hysterical; it was a spasmodic contraction of the œsophagus; a form of hysterical affection to which Frederick Hoffman first called attention. What was peculiar about it was the commencement; in almost all the recorded cases of this affection, it is found that it commenced while swallowing, and, in a great majority of cases, while eating soup.

These patients have a local pain, and they are so entirely convinced by this that a foreign body is lodged there, that it is impossible to dissuade them. M. Nélaton said that they

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dominal walls by the aid of sutures, which were passed through the skin and through the peritoneal and muscular coats of the stomach; the opening of the stomach was delayed until adherences should have formed between it and the abdominal walls; two hours afterwards, during a violent attack of cough, the stomach was dragged into the abdomen. The threads of the sutures were removed, and a portion of the stomach pulled out was inclosed in the forceps of Assalini, with the hope of obtaining adherences, and afterwards, an opening, in consequence of the mortification of the part inclosed by the forceps. By the fifth day solid adhesions were established, the gangrene was complete, and the mortified part was cut off by the scissors. Nutritive injections were then thrown in through the fistula, but at the expiration of ten days the patient died of peritonitis.

had frequently come to him on account of pretended needles, that had been swallowed; the first time he was deceived, and committed an error against which he warned the class; pushing his fingers deeply into the pharynx and towards the side, he felt a small resisting body, and went so far as to make several attempts to seize it with forceps, before discovering it to be the great horn of the hyoid bone.

In this case, M. Nélaton introduced the instrument of Graeff, without meeting with any obstacle. He did not try to convince the patient that there was no foreign body in the œsophagus; it is useless to attempt it. The treatment of these cases is general; castoreum, assafœtida and other antispasmodics; and a local application over the seat of pain; the foreign body has disappeared, as if by enchantment, after the endermic application of morphia; others have been successfully treated by strychnia. M. Mondière praises, above all, the catheterism of the canal, and likens its effect to that seen in spasms of the urethra; in his memoir, many such cases are related.[1]

M. Nélaton introduced the catheter, and externally he applied chloroform, held in contact with the skin by a piece of diachylon. In the course of a few days the foreign body, that is to say, the sensation of a foreign body, had disappeared.

Tracheotomy (*in a case of Croup*).

December, 1851. A little girl, four years of age, was carried to the hospital, toward the close of the fourth day of an attack of croup.

The symptoms were most alarming. After trying all he could, the physician in attendance, despairing of deriving any benefit from medicinal agents, had advised tracheotomy as the only resource. M. Nélaton performed the operation, with barely a hope of saving the child, as the accomplishment of a duty; nothing, he said, could be more painful than to be forced to operate under such circumstances. The first time he had practised tracheotomy, it was followed by success: since then he had operated in twenty-four cases, and every one died. He still, however, persisted.

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[1] The memoirs of Mondière, on the accidents caused by the sojourn of foreign bodies in the œsophagus, his researches to aid in the history of acute and chronic œsophagitis, and his researches on stricture and on spasm of the œsophagus, are to be found in the *Archives Générales*, vols. xxiv., xxv., xxvii. and xxx. of the 1st series, and in vols. i., ii., and iii. of the 2d series.

As to the manner of performing the operation, he used to perform it in two strokes of the knife, one to reach the trachea, the second to open it. This method of operating is brilliant, but he has renounced it, because he has seen cases in which the patients died from the introduction of the blood into the trachea. It is best to proceed with slowness, following the different layers of tissue one by one; the veins can thus be removed from before the knife, you pass surely between the muscles, you wait until the hemorrhage, which may follow the incision of the isthmus of the thyroid gland, is over, and then open the trachea when all is dry. Death does not take place in these cases because the trachea has been opened too late, for it does not result from a continuation of the asphyxia, but from a continuation of the disease. To check this, he has used nitrate of silver, in injection, but it coagulated the mucus of the air-passages; he then tried potassa, but had to renounce it also.

Sometimes after the operation, in swallowing, liquids pass into the trachea; the surgeon is then forced to introduce them into the stomach by means of a hard catheter: there is no alternative.

The child died the day of the operation.

Penetrating Wound of the Chest.

November, 1853. A young man, employed in a kitchen, was brought into the hospital one Saturday evening, on account of a wound of the anterior part of the chest, inflicted by himself. In the afternoon he had been suffering dreadfully from toothache, and in order to relieve himself, he could think of nothing better than to strike with a small knife at the region of the heart. He fainted immediately, and, when brought to himself, his difficulty of breathing was so great, that his friends were induced to bring him to the hospital.

At the anterior part of the chest was a wound, and as the surgeon is liable to be brought before court in such cases, he should always be able to describe these wounds with precision. This wound was situated one and a fifth inch from the internal border of the areola of the nipple, and two and one-tenth from the lateral border of the sternum, corresponding to the anterior extremity of the fourth intercostal space: its extent was two-fifths of an inch, and the knife had a blade of that width, though this is not very important, for the instrument could be pressed upon so as to make the wound much wider than itself; the direction of the wound was nearly transverse.

On the following day, the touch detected crepitation on that side of the chest, extending up to the clavicular region; there was emphysema, and the functional troubles of the respiratory organs were quite marked; the oppression in breathing was very great; the patient complained of pain, and principally at a point two inches from the wound, just below the point of the heart. By auscultation, all seemed natural; by percussion, all in the posterior portion of the chest was normal; anteriorly, above the wound, all was normal, but at the wound, over the heart, and below it for a distance of nearly an inch, the sonorousness was too great. This sonorousness, which had existed when the patient entered, had at that time been attributed by M. Nélaton to the stomach, but the emphysema, which made its appearance on the following day, showed him that he had been mistaken. Authors, Jean Luis Petit among the number, speak of emphysema occurring when a wound upon the chest has not been a penetrating wound; but, upon reflection, this must be seen to be an impossibility. Of course wounds inflicted by a cutting instrument are here spoken of, for if the tissues are contused, in a very short space of time there can be a development of gas; but it is only in such contused wounds that this is seen, and M. Nélaton does not believe at all that non-penetrating wounds can give rise to emphysema. This error of Petit was combated by Boyer.

In this patient, therefore, the wound was not simply one limited to the walls of the chest, but the cavity had been penetrated. In penetrating wounds of the chest, sometimes only the pleura covering the walls is injured, and emphysema can arise from this; but most generally the instrument enters the lung, and thus we have the condition most favorable to the occurrence of emphysema. When the external opening in the walls of the chest is large, air can enter through it into the cavity; when it is small, and the edges come together so as to close it, the air escapes from the opening in the lung, for the lungs are acted upon by the walls of the chest as by a cupping-glass; and, when the air has come out, it cannot enter again, for the pulmonary vesicles close in expiration. At last the cavity becomes full of air, and then it tends to escape; forcing its way into the wound in the walls of the chest, it is propelled into the cellular tissue, and emphysema is produced. It is thus, in the immense majority of cases, that emphysema takes place; and it had taken place in this way in the young man, having been preceded by a collection of air in the cavity of the chest, which had given rise to a sonorousness that M. Nélaton had, at first, wrongfully attributed to gases in the stomach.

How was it, however, that respiration could be heard all over the chest posteriorly, and over the whole upper half anteriorly? On asking the patient, it was found that he had been very subject to pectoral affections; and it was supposed that in consequence of them, the lungs had become united by false membranes to the walls of the chest. M. Roux has written a most valuable memoir on the utility of false membranes in limiting these gaseous effusions.[1] There had been, in this case, a wound of the small lobe covering the heart, and then an effusion of air limited by the false membranes.

Moreover, M. Nélaton said he would not be surprised if in this case there had been an opening of the pericardium, and even a wound of the heart. Wounds of the heart are compatible with life for several days; there is a case recorded of a watchmaker, who lived for twenty-three days after the receipt of a wound from a sharpened file, which at the autopsy was found to have passed entirely through the left ventricle and to have entered the right; the file broke at the surface of the chest, and had been left in the wound. There is another case reported of a young negro, who received, at a very short distance, a gunshot wound upon the breast; he lived for sixty-three days, and at the autopsy three shot were found loose in the right ventricle, and two others in the auricle. The openings through which the shot had entered had cicatrized, but they were easily detected. M. Nélaton himself has seen a case where the man had been struck by a knife in the region of the heart, and who had been brought to the hospital in very much the condition of the patient at present there; on the fourth day he was at the window, when he saw his murderer pass by; he became greatly agitated, and in a short time died. At the autopsy, the heart was found to have been wounded by the blow.

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[1] "Sur les avantages de l'adhérence du poumon aux parois de la poitrine lors des plaies pénétrantes de cette cavité."—*Mélanges de Chirurgie*, p. 78.

In this case, cups were applied over the side of the chest, the man was kept in bed, very little food was given to him, and the greatest prudence was enjoined. Four days after his admission, he slept equally well on either side, and a few days afterwards he left perfectly well.

The case of the young negro above referred to by M. Nélaton, must be the one reported in the *American Medical Journal* for May, 1829, as having occurred in the practice of Dr. Leonard Randal, of Tennessee. The boy, fifteen years of age, received the load of shot, the size of which is not stated, at a distance of but six feet. It entered to the left of the sternum, an inch and a half below its lower extremity. The external wound cicatrized in three or four weeks, and the patient was able to walk about; but from some cause or other he relapsed, a hectic fever supervened, and he died on the *sixty-seventh* day after the accident. The auricle did not seem to be much injured by the presence of the shot; the ventricle was lined by a thick coat, from which there projected numerous papillæ of a dun color, giving it the appearance of the upper surface of the tongue of an ox. Besides the condition of the heart, "the left lobe of the lung was inflamed and adhering to the pleura, and lodged in various parts of its substance were found a number of shot. The right lobe was nearly obliterated, its cellular substance entirely lost, with a small portion of serum in the pleura."

In the *New York Medical Times* for April, 1855, is a report of the case of Poole, whose death created so much excitement in that city. He survived a gunshot wound of the heart for nearly twelve days, without any palpitation, syncope, or irregular action of that organ. At the autopsy the ball was found in the substance of the heart, where it had lodged after entering the sternum just at its junction with the cartilage of the fifth rib, passing through the bone and the pericardium. The pericardium contained about thirty ounces of a sero-sanguinolent fluid: the surface of the heart was covered with fibrinous exudation, the product of recent inflammation. The ball, after having been vainly searched for for two hours, in the chest, was found embedded in the muscular substance of the heart, which had healed over it so that the point of entrance was obliterated. Its lodgment was in the septum, between the ventricles, about an inch and a half from the apex of the heart, and a quarter of an inch from its surface. He died from an effusion in the pericardium stopping the action of the heart. "Under more favorable circumstances, with perfect quietude of mind and body, there seems but little room to doubt that he might ultimately have recovered." From the time of the reception of the wound to its fatal issue, he was surrounded by most exciting and disturbing influences, both physical and moral.

CHAPTER II.

AFFECTIONS OF THE BLOODVESSELS.

Erectile Tumors. (Congenital.)

MAY, 1852. A young child with an erectile tumor, situated on the forehead. These tumors are of two kinds, those occupying the skin, and those situated beneath it. As a general rule, the former are arterial, and the latter are venous. In the present instance, the tumor was of both kinds.

When the tumor is cutaneous, the method of treatment *par excellence* is by caustic. When it is subcutaneous, it is not the same thing; the caustic produces an unnecessary scar, and moreover the blood will flow from a multitude of small orifices, and will carry with it the caustic. The seton and needles have been employed, but they cannot be relied upon; excision is dangerous in these young patients, on account of the great vascularity of the tissue. The best way of treating them is by the actual cautery, which can be used in two ways, directly upon the skin, which leaves a great scar, or, which is the proper way, by cauterizing the subcutaneous tissue, leaving the skin untouched. M. Bérard had a small cautery made for this purpose: the cauterizing portion is a very fine wire, and in order that it may not cool too rapidly, a large ball of iron is attached to it, that serves as a reservoir of caloric. By means of this, the subcutaneous tissues are destroyed, the eschars are eliminated, and afterwards the skin becomes united with the bottom of the cavity. In place of the instrument of Bérard, which will get cool, notwithstanding the heated ball to which it is attached, the electric cautery, with a simple platina wire, the temperature of which will be very elevated all the time, can be used with great advantage.

The electric cautery was made use of in this instance. The child was taken away from the hospital immediately after the operation, and was not brought back again.

April, 1853. A child, who had a small erectile tumor, situated in the groove between the lower lip and the alveolar processes. M. Nélaton said he would not review all the different operations which have been recommended in these cases, but would merely call attention to the fact that, in all, a great point was the avoidance of a scar. When the tumor is in the skin itself, almost any of the operations will answer, for you must of necessity have a scar; when it is situated under the skin, it is a different affair. In this instance, where the tumor was placed inside of the mouth, any method would answer, for a scar was of no importance. On this account the ligature would be made use of, for by it the tumor would be destroyed without danger of hemorrhage. In all cases the ligature is applicable, for it is not necessary in order to apply it, that the tumor form a projection; no matter how flat it be, by means of curved needles the threads can be passed beneath it.

By means of curved needles two double ligatures were passed under the tumor at some distance from each other, and the needles being cut off, the threads were tied around the tumor, so that it was entirely inclosed by them. M. Nélaton said he had frequently performed this operation, and that he had never seen any accident result from it. By the action of the ligature an inflammation is excited, by which any part of the tumor that may not be inclosed is destroyed as well as the rest.

This child was removed from the wards after the operation, and not brought back again.

March, 1854. M. Nélaton brought before the class a young child, upon whom he had operated a few days before, in the city, in order to have the opportunity of making some remarks upon the case. The child had an erectile tumor upon the forehead, between the two eyebrows; the tumor was venous and subcutaneous. When brought to the hospital, there was a thread traversing it. On account of some peculiarities, he desired to make this digression from the usual course of clinical instruction in the hospital.

Some surgeons have classified erectile tumors as venous and as arterial; the classification may be a just one, yet it is not free from criticism. Another, and a far more important one, is into the cutaneous and the subcutaneous, for this distinction has a direct reference to the treatment. When the tumor is *in* the skin, it can only be cured by the complete destruction of the skin itself; but if it be *under* the skin, it can be cured, and the skin still preserved. In many cases, the cicatrix resulting from the destruction of the skin produces great deformity, and its preservation is of great importance. In order to obliterate the subcutaneous vessels, and still preserve the skin, M. Lallemand, among the first, introduced needles through the mass, in order that by the inflammation thus produced, the vessels might be destroyed. This plan, though very seductive in theory, in practice is found not to answer. Bérard, who applied this method very often, soon saw that it would not do; in place of introducing eight or ten needles, M. Nélaton said he had seen him introduce fifty in a tumor the size of an ordinary watch. It was said then that the needles did not prove sufficiently irritating, because they were metallic, and he had some made of ivory; these did not prick so well, and did no better. Failing with the needles, Bérard next made use of a caustic injection, but the risk was too great; M. Nélaton said he had seen complete gangrene of the skin and all the surrounding parts result from it. It was then proposed to pierce the tumor in every direction by a cautery, consisting of a fine wire, to which a ball of iron was attached in order to preserve the heat. This instrument was also imperfect, for the wire became cold in spite of the iron ball. It was found, however, by Bérard and by Lenoir after him, to answer better than any other method. M. Nélaton said he had also himself used the electrical cautery with very good results.

About the beginning of the previous year, a young child was sent to him by M. Dubois, with a large erectile tumor in the region of the parotid, and this tumor was growing most rapidly. It is well known that vaccination has been spoken of in the treatment of erectile tumors, but only as applicable to the cutaneous. The pustules resulting from the introduction of the vaccine matter are replaced by a cicatrix, which causes more or less deformity according to the case. The action of the vaccine does not extend deeply; it is excellent for some cases, but does not go sufficiently deep for all. The inflammation caused by the introduction of vaccine matter is more *obliterating* than any other. In order to excite this peculiar inflammation in the tumor, five or six threads were first passed through the tumor, and left there for five or ten days, when canals had been formed through the whole mass; this being accomplished, threads impregnated with vaccine were passed through these canals, and left therein. A vaccinal action took place, followed by much reaction; and at the extremities of most of the canals, pustules were formed. The tumor itself became hard and compact, and then commenced to diminish. This case was still going on, everything in a most favorable condition, and with every reason for believing that there would be a cure with but very small scars. In passing the threads impregnated with the vaccine matter, it was necessary to guard against its being wiped off at the exterior orifices; for this purpose a very fine canula was first introduced into the opening, and the thread introduced into it without touching the external orifice. Out of the twelve holes, at the extremities of the six canals, all but two had a pustule, from some imperfection in the manœuvre. There is some special action in the vaccine, which renders it very useful in such cases.

The patient had only been brought before the class in order that an occasion might be offered of making these remarks, and was again immediately removed.

Venous Erectile Tumor.

May, 1853. A young man, very alert, very quick in his movements, who said he had always had good health. Eight or ten years before, a tumor developed itself behind and beneath the angle of the lower jaw; but the patient could not give any particulars about it. Some months before coming to the hospital, he went to a surgeon, who, thinking he recognized a fluid in the tumor, made a puncture with a trocar: nothing came out, however, but some blood. The puncture was followed by an injection of iodine, and the patient said that after this operation the tumor became smaller. The same thing was repeated, and again there was a diminution in the size of the tumor.

This tumor was placed directly between the two bellies of the digastric muscle, and covering slightly the edge of the lower jaw. It was supple, like a wet sponge, and upon squeezing it, so as to try to empty it, it seemed as if there was still something left between the fingers. When pressure was made so as to cause the tumor to come out from beneath the jaw, to form a projection, its surface was found to be mammillated, and it was moreover very difficult to determine how deeply it extended. The skin over the tumor was loose and healthy. This tumor was at first thought to be a lipoma, but the patient pointed out a symptom that modified this opinion. By pressing the tumor in a peculiar way against the jaw-bone with the palm of his hand, he could make it disappear, and by holding his head down, it would come back again, and be twice as large as before. It was evident, therefore, that the veins had much to do with the formation of this tumor; but there was something more than veins in its composition, for when venous erectile tumors are pressed firmly between the fingers, you can feel but the two layers of skin, on account of the thinness of the walls of the veins. In this case, as has just been said, when this pressure was made, it seemed as if there was still something of the tumor left between the fingers, and it was thought, therefore, to be partly solid and partly liquid. In regard to the place where this tumor was developed, it was not in the skin, nor was it directly beneath it, for the skin there is so thin, that the varix would be seen; it was therefore under the aponeurosis, in the position of the maxillary gland. M. Nélaton said that, in just such a case as this, he had seen Bérard very much embarrassed; the tumor was in the region of the parotid, and supposed to be erectile; the child died of some other affection, and the autopsy showed the tumor to be formed of the gland and of veins.

In the treatment of erectile tumors, some surgeons have advised puncture and injection, and thus in this case, the operations already performed may have obliterated some veins and really diminished the size of the tumor. M. Nélaton preferred to pass a seton through the mass and leave it there for eight days; this would cause inflammation, and he thought all might be cicatrized in two weeks. The patient was an actor, and had to return to the theatre in thirty days. The results of the inflammation, caused by the seton, were absorbed, and M. Nélaton was very well satisfied with its effect; when the patient was forced to leave, the tumor had diminished in size, but still existed.

Erectile Tumor.

The expression *erectile tumor* is inexact, inasmuch as it would lead to belief in the accidental production of a tissue anatomically analogous to that of erectile tissue, and enjoying analogous physiological properties. The anatomical examination of tumors susceptible of *erection* under certain circumstances, afterwards to return to their former condition, shows, in fact, that they possess nothing of the structure of normal erectile tissue.

Erectile tissue is formed by a mass of venous dilatations, mingled with filaments composed of fibres of cellular tissue, of muscular fibres of organic life, and of some elastic fibres. It exists only in the corpora cavernosa of the penis; in the corpus spongiosum of the urethra—that is to say, in the bulb of the urethra, the glans, and the intermediary portion of the urethra; in the corpora cavernosa of the clitoris; and in the glans of the clitoris, communicating by veins with the erectile tissue which forms the *bulb of the vestibule*, analogous to the bulb of the urethra, and called erroneously *bulb of the vagina.* This erectile bulb is simple at the base of the clitoris, and double behind, where it is applied against the corresponding branch of the pubis. The nipple, which has been falsely considered to contain erectile tissue, becomes harder and more erect only by the contraction of the muscular fibres of organic life that it contains. The cutaneous and mucous papillæ only become slightly more erect, from the hardening of the derm supporting them, by the contraction of the organic muscular fibres it contains. The voluminous and frequent anastomoses of the veins in the parenchymatous tissue of the spleen, resemble somewhat the disposition in erectile tissue, and the organ enlarges and hardens when the blood is retained in these veins; but they do not form cells communicating with each other, or with the arteries on one side, with the efferent veins on the other, by orifices smaller than themselves, as in erectile tissue. The walls of the vagina, the tissue around the neck of the bladder, the seminal vesicles and the neighboring parts of the pelvis, have been considered as erectile, on account of the size of the frequently anastomosed veins of those regions; but they do not possess venous cells with intermediary retractile filaments and partitions.

If all tumors which become turgescent, under the influence of position, compression of the veins, or congestion produced by rage, shame, &c., be classed together, anatomy will show them to be of very different characters. Anatomically, four varieties of bloody tumors, capable of becoming turgescent, can be very clearly distinguished.

In the first group, are those tumors called *cirsoid aneurisms*, formed by the dilatation of arteries, become flexuous, with thickened walls, and which seem to be more numerous than in the normal condition, owing simply to the increase in size of the very small branches. These are tumors of the kind known as *arterial fungus hœmatodes*, *arterial varicose tumors*, and as *acquired arterial bloody tumors* in opposition to the *congenital.*

In the second group, are the *vascular nœvi materni*, or *congenital bloody tumors*. They are most generally both venous and arterial, the affection commencing by the capillaries. When the tumor is ulcerated or incised, the capillaries, dilated, and above all deprived of their normal contractility, allow the blood to flow away from them as from a pressed sponge. In the nævi and the tumors which they form by increasing in size, it is easy to determine by the microscope, a dilatation of the capillaries, with thinning of their walls; the blood is stationary in them, or flows more slowly than elsewhere; for these capillaries are always full of globules after death, or after their removal by an operation. The most striking fact consists in local dilatations, which are observed at slight distances from each other in many of the capillaries.

In the third group, are comprised the tumors called *venous erectile*, *venous*, or *varicose*, in which the affection is not seated in the capillaries, but either in the large veins forming tumors generally called *varices*, or in the very small veins just visible to the naked eye. At the same time that they are dilated, the walls of the varicose veins preserve their thickness, or even increase it; and of the four tunics the most hypertrophied are the third, or the one with circular fibres, and the fourth, or the one of cellular tissue; the elements of the cellular tissue are increased in quantity, and not those of the elastic tissue, nor the muscular fibres of organic life. Venous tumors of this group can be met with, not only in the cutaneous and mucous membranes, or immediately beneath them, but also in the thickness of the tissues, as may be quite often observed in the epididymis, the testicle, the ovary, the muscles, the thyroid gland, etc.

Besides being enlarged, the varicose veins have sometimes, as in varicocele and in hæmorrhoids, lateral dilatations, full of blood, and sometimes of clots, which may be incrusted by calcareous matter and form true phlebolithes. It should be noticed that, in hæmorrhoids, the tissue interposed between the veins is cellular tissue, accompanied by a certain quantity of fibro-plastic elements, and of elastic fibres, indurated by the presence of granular, amorphous matter, which renders the fasciculi very adherent.

In a fourth group, are comprised the tumors called *erectile*, which are *formed by the extravasation of the blood outside of the vessels.* This last kind of vascular tumor, susceptible of erection when the circulation is modified or momentarily intercepted, is very remarkable; and its true nature was not pointed out before M. Robin did so, in a memoir read to the Biological Society of Paris, in 1853. These are tumors characterized by an accidental communication, from violent contusion, or some cause difficult to determine, of one or several voluminous vessels with irregular cavities, normal or accidentally produced in a tissue, and which go on increasing as the blood continues to press its way; these cavities are not a dilatation of the vessels, nor accidental sinuses lined by a vascular tunic; the blood which circulates in them is entirely outside of its natural passages. If the blood does not coagulate, it is because, in the economy in contact with our tissues, the fibrin, except in cases of cachexia, can remain liquid a long time without being coagulated. Sometimes these tumors have their origin in the arteries, sometimes in the veins, which accounts of course for the presence or the absence of pulsations. Of this kind, are the tumors called *Pott's aneurisms*, and *erectile tumors* of bones, of which a case is reported among those of cancer of the bones. In that case, the absence of pulsation led M. Nélaton into an error of diagnosis; the origin of the affection had probably been in the veins.

Veno-arterial Aneurism.

November, 1853. A woman entered the wards, having been sent by a very distinguished surgeon out of Paris to be examined.

Her affection was very complex; the symptoms under which she labored were to be referred to several distinct affections.

The condition of her tongue was very peculiar; it was larger than natural, and deformed, having here and there lumps of a peculiar bluish color. In some places, the organ was of its normal consistence, in others it was harder or softer; besides this, its surface, particularly at the base alongside of the papillæ, was not normal; there were large violet-colored granulations, like mushrooms, upon it. There were also violet-colored spots upon the lower lip, externally where the mucous membrane joins the skin, and on the inside were small bluish tumors. When these places were pressed upon, the color and also the projection disappeared; they evidently were owing to a varicose condition of the parts. The same thing, moreover, existed upon the side of the neck and beneath the jaw.

Inside of the mouth, under the tongue, was a projection, bluish, but more pale than would be a simple dilatation of the veins. Under the jaw was another projection, and by proper pressure it was found to be the same tumor with that under the tongue. This tumor was supposed to be ranula. The orifices of the ducts of Wharton were free; when carefully wiped, the liquid was seen to issue from them.

There was, moreover, a third order of symptoms, which could have caused the belief in the existence of an aneurism, for which affection the woman had been sent to the hospital. In the region of the carotid was a tumor, situated alongside of the larynx, and extending upward as far as the projection caused by the ranula. This tumor, by pressure, was made to disappear with the greatest facility; it pulsated, and the pulsations were isochronous with those of the arteries; it also presented *frémissement.* This *frémissement* was very apparent; in order to appreciate it, the pressure had to be very slight. Auscultation made known a very important sign, a *bruit de souffle*, but of a peculiar character; and as this sound belongs to but few affections, the surgeon should always examine it very carefully; this *bruit de souffle* was continuous, only at each beat of the heart it was augmented; it was what the French call a "*bruit continu avec renforcement.*"

In regard to the functions of the parts, there was a slight difficulty in eating and in speaking, but the condition of the tongue, and the tumor in the mouth, explained this. In these cases some patients complain very much of the sound, but this woman did not hear any. The brain in this case was not at all affected.

These things being determined, three diseases could give rise to these symptoms. In the first place, there was a ranula, and besides that, there were two vascular affections. The tumor of the tongue was a venous erectile tumor, and this, as is almost always the case, was congenital. The other affection was either an arterioso-venous aneurism, an aneurism by anastomosis, or else what is called arterial varix. The peculiar sound spoken of as existing in this tumor, the continuous *bruit de souffle*, is only found in three conditions, in chlorosis and in the two affections just mentioned. In this patient it was not owing to chlorosis, for it was only to be heard on the one side, and there were none of the other symptoms of that affection. In aneurism by anastomosis, the two vessels being side by side, a lateral perforation allows the blood to pass from one to the other: generally, in the vein an ampulla is formed, or, if not, it dilates in its terminal ramifications, that is to say, in the direction towards which the arterial blood rushes. Arterial varix is a dilatation of the artery in all directions without any known cause: it becomes very voluminous and tortuous. This affection, like the other, gives rise to the *bruit continu avec renforcement*. In false consecutive aneurism there is sometimes a *frémissement*, a *bruit de souffle*, but it is not continuous. The affection was, therefore, either an arterial varix or an arterioso-venous aneurism, and, in order to decide the question, some important signs existed to be taken into consideration. If it were an arterial varix, the sound would be extended everywhere throughout the whole region: it is very rare that the disease does not extend itself to all the arteries of a part. The *frémissement* would be felt, and the peculiar sound would be heard in a case like the present, as well in the temporal arteries as in the carotids: here the sound was greatest at the superior border of the thyroid cartilage, and decreased above and below: it was very evident that the sound was produced in a very limited part. This fact, together with the absence of flexuosities in the arteries, induced M. Nélaton to admit the existence of a communication between the artery and the vein, of an arterioso-venous aneurism. A difficulty presented itself here, for almost all the reported cases of these aneurisms assign a wound as their cause. It is very well to know, however, that they can be produced without any traumatic lesion; and, though very curious, it cannot be doubted. Mr. Turnham, of Edinburgh, has reported one case between the aorta and the ascending vena cava, and three between the aorta and the descending. M. Nélaton has himself seen a case in the crural artery and vein, where it was impossible to find a cause in the antecedents of the patient; it has also been observed in the iliac. It is difficult to explain these communications; but, in many regions, there are large veins and large arteries alongside of each other; if the artery be affected with cretaceous, or atheromatous productions on the side opposite to the vein, there will be a false consecutive aneurism; but if on the adjacent side, it is easy to see that the vein, being compressed in the inflamed walls, could be attached, and a communication between the two vessels be established. In case, moreover, a varicose condition of the veins existed, as in this instance, it would be a predisposition to this affection.

About two weeks before coming to the hospital, this patient had had an attack that had placed her in great danger, and it was on account of it that she entered. An enormous tumefaction on the left side, by which the whole space between the jaw and the shoulder had been filled, had taken place, and the general symptoms accompanying it had been very severe. When she entered, hard lumps were found here and there throughout that region; the lumps were clots of blood resulting from inflammation of the varicose veins, which had given rise to the alarming symptoms that had before existed. These varicose tumors, when inflamed, can give rise to grave and serious errors; and the following interesting case was related by M. Nélaton. Six years before, an ecclesiastic had gone to him, sent by another surgeon of Paris, to ask his opinion in regard to an enormous tumor. Immediately under the clavicle was a large mass, in the axilla was another, and it was easy to perceive that these were portions of the same tumor which passed under the great pectoral muscle. The superficial veins of the whole region were varicose, and gave it an appearance resembling that found in encephaloid tumors. This patient had been seen by all the surgeons of Paris, and they were all of the opinion that there was an encephaloid tumor developed behind the great pectoral muscle. An operation was decided upon for its removal; the muscle was to be cut across, and the disease then extirpated. When M. Nélaton saw the patient, he doubted as to the affection being encephaloid, and moreover, granting that it were, he thought the chance of the operation proving useful to be but very small. The patient stated that, ever since his infancy, he had carried a tumor, bluish, lumpy, and disappearing upon pressure, below the clavicle; a pad properly placed under the suspender was sufficient to drive it away, and it was the only application ever made to it. In a few months this tumor had changed, so as to present the appearance it then had. Acquainted with these details, M. Nélaton supposed the case to be one of varicose tumor that had become inflamed, and advised the patient to wait. In the course of time the clots of blood were absorbed, and although a good deal of the tumor still remained, the patient was enjoying excellent health. The same thing had taken place in the present instance, and the woman was still much annoyed by the large swelling at the side of the neck.

In the treatment of this patient, there were three affections to be attended to. In the first place, the venous erectile tumor; it is well known that these tumors, when persons reach a certain age, remain stationary, and no longer give trouble, so that it would not be interfered with. In regard to the ranula, the usual operation would be performed. The third affection, the arterioso-venous aneurism, it was thought best not to meddle with. These aneurisms behave differently in different parts of the body, and require, accordingly, different modes of treatment; if, for instance, it be placed upon the arm, and the patient is one who is not forced to work hard, it had better be left alone; if, however, it exist upon the lower extremity, it must be operated upon. In this case, the aneurism was situated in the most favorable place possible, and it would be best not to touch it. There was here no false consecutive aneurism; for were there one between the vessels, there would have been clots of blood, and the tumor could not have been made to disappear by pressure; here, it did so entirely. Moreover, the only operation which can be performed in such cases, is to search for the opening in the artery, and then to apply ligatures above and below; such a proceeding could not be pursued in this case. The treatment of the case was, therefore, limited to the performance of an operation for the relief of the ranula.

When the trocar was plunged into the tumor under the tongue, nothing but venous blood issued. M. Nélaton said he had opened one of the varicose veins, before reaching the ranula. The flow of blood was quite abundant, and interfered with the operation; so that M. Nélaton was content with making as much come out as he could, and only using water as a subsequent injection. The patient did very well until the fourth day after the operation, when she had buzzing in the ears, was delirious at night, and had several liquid stools. She did not complain of the region operated upon when it was touched, and she was able to swallow without difficulty; her pulse was more frequent than natural, but there was nothing to be remarked in the respiration. On the third day from the commencement of this attack, there had been but one stool since the day before; but the condition of the woman was very alarming; her appearance had changed profoundly. On the sixth day she died. At the autopsy, pus was found under the arachnoid, but nowhere else in the body; there were no signs of purulent absorption in any part. M. Nélaton said the patient had died from an attack of meningitis. It should be mentioned that, at that time, there were many cases of cholera in the hospital. When a canula was introduced into the opening made under the tongue, and air blown into it, the whole submaxillary venous mass was blown up, and the tongue also, so that it was everywhere crepitant. The dissection of what was supposed to be an *arterioso-venous communication, direct, without any false consecutive aneurism,* was performed with the greatest care; an injection was thrown, with gentleness and slowness, into the primitive carotid; and, at the expiration of a few moments, it flowed back from a small venous branch. This, it is true, can always be accomplished, but it requires generally more force than was employed in this instance. It was, however, impossible to find the place where the communication existed; the thyroid, the lingual, and the facial arteries were followed with the greatest care, but the search was unsuccessful. There was no aneurism of the carotid, nor was there a varicose condition of the arteries.

The excellent paper on *Spontaneous Varicose Aneurism,* by Thurnam, is in the fifth volume of the *Medico-Chirurgical Transactions,* 2d series. There is also a very interesting report of a case, by Dr. Mayne, in the *Dublin Quarterly Medical Journal*, for November, 1853.

Varix.

November, 1853. The coachman, who was at that time in the wards, undergoing treatment for urinary fistulæ, had upon each thigh, but principally upon the left, a tumor, situated where crural hernia is generally observed. The tumor was soft, disappearing on the slightest pressure, and the least effort, as a cough, augmented its volume and pushed it farther out. Again, when the patient coughed, a *frémissement*, or gurgling, was felt, that could be taken for the sensation experienced when a hernia is escaping. These tumors are often taken for herniæ.

The situation of the tumor, just where the saphena vein empties into the crural, the ease with which it was reduced, the varicosed ramifications of the vein, the *frémissement*, &c., showed it to be a varix. Many students asking if there was no treatment for these varices, a question presented every day in surgical practice, M. Nélaton spoke about it at some length.

Varices have always attracted the attention of surgeons. The operations of Petit, &c., had been abandoned, when, at the commencement of this century, they were again taken up. Béclard, one of the first, tied the saphenous vein where it empties into the crural, hoping that the blood below the vein would coagulate. An attentive study, however, of the venous communications showed him, before long, that this hope would not be realized. He then used two or three ligatures, applied so as to have between them a space where the blood could not circulate. The same thing happened as when but one ligature was used, the coagulum only formed a little above and a little below, and the circulation was re-established. Besides, in many cases, the patients died of phlebitis, the inflammation going beyond the adhesive stage. About the same time, Dupuytren performed the same operation, but he soon renounced it. After that time, operations for the radical cure of varix were not much spoken of in France, until, in 1839, M. Bonnet, of Lyons, again called the attention of the profession to them. His method was the destruction of a portion of the vein by means of caustic. In the treatment by the ligature, besides the persistence of the circulation in anastomosing vessels, there is another cause of failure, the determination of which, M. Nélaton said, at first had much surprised him; this is, the re-establishment of the circulation in the ligatured vein. If, in a large dog, the radial vein be tied, in three days the ligature falls, and in three months, on killing the animal, the tube of the vein will be found re-established. M. Bonnet was probably acquainted with this, and, on this account, embraced the idea of destroying the vein to a certain distance. He applied caustic potash here and there directly upon the skin over the vein, and thus destroyed the tissues as deeply as he wished, forming an eschar about one inch in diameter. A number of cases treated in this way are published as cured. M. Laugier also made use of caustic potash, but he previously exposed the vein by an incision. Bérard operated in the same way, but he used Vienna paste. By these means an eschar is formed, which is afterward eliminated. The patients are enjoined to remain in bed; for in several cases terrible hemorrhages have taken place from the opening of a portion of the walls of the vessel, a danger inherent in the operation. The hopes of avoiding the dangers of the ligature vanished, for the patients died from purulent absorption as before. Moreover, the vessels became again permeable to blood, even at the point where the caustic was applied. At the time when Laugier and Bérard were performing their operations, M. Nélaton was at Bicêtre, and saw their patients. Although they said they were better, he never had much confidence in their amelioration, for the cases were in hard-working laborers, who would find themselves better from repose alone. The operation had been abandoned. Even M. Bonnet gave up the caustic potash, saying that it only gave rise to a plastic effusion, which was afterward absorbed; he applies, as before, first, the caustic potash, and then, on the eschar formed by it, he applies Vienna paste or chloride of zinc, and says he obtains better results; but we shall see.

M. Velpeau has operated by excising a portion of the vein. The ligature fails, for the circulation is re-established; caustics fail for the same reason, and the excision is followed by the dilatation of the veins above.

The only way to do, would be to arrest the circulation in a long portion of the vessel. A surgeon of Trieste, whose name M. Nélaton could not recall, had endeavored to accomplish this by means of acupuncture, and reports sixty cases that are very satisfactory; the blood was coagulated, and the walls of the veins were contracted and united to the coagulum. His results, however, are given too soon; two or three months are not sufficient, and the patients must be followed after having resumed their occupations. It cannot be said that the efficacy of this means has been demonstrated.

A surgeon of Bristol, Mr. Herapath, says, that the cause of varix is the narrowing of the fibrous orifice where the vein empties, as where the saphenous empties into the crural, or the external saphenous into the popliteal. As a consequence of this theory, to cure a varix, you must enlarge the fibrous ring. Several patients are reported as cured by such an operation; but, as in the modes of treatment already described, the reports are made before the cure can be considered as established. This operation, singular as it is, has been repeated in Paris by M. Malgaigne, who says the condition of the patients was ameliorated, but he also speaks too soon. This narrowing of the orifice is a pure supposition; we know that when the vein is dilated, the orifice is enlarged; in the patients at that time in the wards, the finger could be passed with ease into the hole alongside of the veins.

M. Nélaton said he did not think that there would be any very great inconvenience in injecting a few drops of the perchloride of iron into the vein. He said that M. Giraldès had recently shown him the carotid of a horse, where two drops had sufficed to obliterate the vessel.

His opinion is, that, at the present time, there is but one method of treating varix, the palliative. The best is the application of an elastic stocking, one that is only elastic *circularly*. Persons who can afford to buy such a stocking, extremely well made, are rendered very comfortable by wearing it, and he would apply to the Administration for one.

The huge plexuses of veins, the *intestinal-looking* veins, are not those that are painful: the small venous dilatations in the thickness of the skin are those that give pain. In this case some small veins on the side of the foot were those of which the patient complained.

The conclusion to which M. Nélaton has arrived as to the treatment of varices, that is to say, that the treatment as a general rule should be limited to palliations, is the one now usually held by surgeons.

The radical cure of varix has been discussed without reflecting on the following facts:—

1. The disease consists in dilatation and lengthening of the veins, with thickening rather than thinning of their walls.

2. The varices are situated in venous branches of small size, and not on the venous trunks themselves, which remain healthy, with their normal volume, in the midst of the largest collateral varicose masses.

3. Varices are owing to a general condition of the tissues of the venous system, as shown by the preceding facts, and also by the return or the extension of the disease to the neighboring veins after the operation; as is seen in all cases in which there is perturbation of nutrition, or modification of texture in a whole anatomical system, as the arterial, the epithelial, etc.

4. It is observed, that compression of the venous trunks is only an occasional cause of varices; they are, in fact, developed in many cases where there is no compression of the veins; they do not occur in all pregnant women; and, when they do occur, it is certainly only in those whose venous system offers the conditions met with in men affected with varices, for otherwise they would not be seen situated in a limited point of the lower extremities without dilatation of the principal venous trunk.

The injection of the perchloride of iron, which M. le Docteur Pravas advised in the treatment of aneurism, has also been used in the treatment of varicose veins. This substance, thrown into the vessels, coagulates the blood contained. When used in varices, a ligature was first placed around the limb, above and below the point where the puncture was to be made, care being had that the patient previously walked about, so as to render the tumors more projecting; the ligature being placed, the syringe is filled with the perchloride of iron, and that no air may be left in the interior, the piston is turned until a drop shows itself at the extremity of the instrument. When this is done, a trocar with its canula is introduced, obliquely and with slowness, into the vein, the instrument being maneuvered as if it were an awl. The trocar being withdrawn, the beak of the syringe is at once fastened to the canula by means of screwing, and the piston is made to descend by turning the piston as many times as you wish to throw drops of the perchloride into the tumor.

After the injection, the violet color of the skin is changed to a reddish, the cellular tissue is firmer, and in it can be easily distinguished, by its greater consistence, the subjacent clot. The first consecutive phenomenon is a slight inflammation of the skin, which declares itself generally about ten hours after the operation, and which can terminate by resolution, by induration, or go on to suppuration. The inflammation can also terminate by mortification, and without causing any serious symptoms.

The operation succeeds perfectly, so far as the obliteration of the vein, at a particular point, is concerned; and the general symptoms following it are of no consequence.

The *perchloride* or the *tritochloride of iron* should be prepared as follows, when used in these operations: Dissolve with heat, in a matrass, the hydrate of the oxide of iron in hydrochloric acid, the iron being in excess; filter the liquid and pour into a porcelain capsule; evaporate a great part at a slow fire; finish the evaporation of the concentrated liquid in a water bath, on an alembic that conveys to a distance the vapor of the water, which should not circulate about the capsule; evaporate until no more vapor arises from the liquid, and a drop coagulates on a plate in cooling. The salt thus obtained is dissolved in distilled water, so that Baumé's areometer will stand at 15°; thirty drops of which solution are sufficient to coagulate energetically eight or ten cubic centimetres of blood. At 30° the solution coagulates less quickly, and causes inflammatory accidents; below 15° it would be too feeble. The salt must be preserved in solution, for when dry it changes very easily.

The preparation of the perchloride of iron has been given, because, under the head of *tincture of the chloride of iron*, the *Dispensatory*, referring to *Ranking's Abstract*, vol. xvii., says, that "it has recently been employed with success as an injection in aneurismal tumors." It was the preparation described above, and not the tincture of the chloride, that was used by Pravas and Deslongchamps.

CHAPTER III.

CANCER.

Cancer, Encephaloid, on the Thigh.

JANUARY, 1852. A woman, fifty years of age, from the country, with a tumor situated on the anterior internal part of the thigh, on the right side.

When she entered the hospital, it presented itself under the form of a large mushroom. At first, she said, she had noticed a swelling about the size of a nut, to which she did not pay much attention; after some time, she had lancinating pains in it; it became larger; and eight days before her entrance, it had opened and commenced to discharge a thin, bloody matter.

To this large bleeding mass, shaped like a mushroom, as said before, there was attached a pedicle which penetrated into the integuments, but not deeply; it could be moved about freely. The parts in the neighborhood were healthy; there was not the slightest alteration in the ganglions.

This tumor was encephaloid. Their progress is this: Ulceration and elimination of a great portion of the tumor, and excessive hemorrhages. At the same time that this is going on, the ganglions often remain intact, which is exactly the contrary of what is seen in scirrhous tumors.

The treatment, is the extirpation of the mass: every portion, as far as the aponeurosis covering the limb, should be extirpated without hesitation, so as to leave nothing of it behind. Notwithstanding the great probability of a return of the disease, the operation should be practised. The cause, very often, of the return is that enough is not taken away.

The patient recovered without any accident after the operation, and left the wards, in a short time, well.

This patient returned to the wards in April, 1853, consequently about fifteen months after the operation, with a tumor of the inguinal region of the right side. A *concours* was going on at the time, and this tumor was given to a candidate for diagnosis; not being acquainted with her previous history, he was completely at fault.

The tumor was formed by an engorgement of the lymphatic ganglions in the groin, and it was extirpated by M. Nélaton. The wound healed, and the patient again left the hospital well.

Cancer, Scirrhous, in the Axilla.

May, 1854. A woman, forty-five years of age, fleshy, and apparently very healthy, had, nevertheless, a very serious affection. Two years before, she noticed a small tumor in the thoracic portion of the arm-pit; it persisted and became painful, and becoming uneasy about it, she came to the hospital.

A small tumor was found there, partly cutaneous and partly beneath the skin; the skin itself was attacked; it was depressed as if by a cicatrix, very hard and cartilaginous; this hard indurated spot was as large as a ten cent piece, and penetrated more deeply into the arm-pit than would have been supposed. The tumor felt as if there were a chain of ganglions extending deeply to the ribs; above, it was difficult to limit it; below, it could easily be done.

At first, M. Nélaton thought that there had been a chain of ganglions that had suppurated, and this had left behind it the hardness; but, although very pressing in his questions, the patient maintained that there had been no suppuration.

Evidently, M. Nélaton said, the affection must be a cancer of the skin, and of the lymphatics. It was then limited, and this fact induced him to operate. In doing so, he would make a very large loss of substance, far beyond what was seen to be diseased. The surgeon should be distrustful of these cancers, in appearance benignant, for they return as the others.

In the operation, M. Nélaton tied the arteries as he went along, although there was not much hemorrhage; the woman was under the influence of chloroform, hence there was no reason to hurry.

The microscope could discover no elements of cancer in what was removed. This, M. Nélaton said, only showed that the question was not yet settled; he could almost say, so much the worse for the microscope, for the case was one of cancer if there ever was one.

Under the name of *cancer* many diseases essentially different, so far as their anatomy is concerned, are still often confounded. According to M. Robin, these are: Epithelial or epidermic tumors; several varieties of hypertrophic tumors of glands; one or two varieties of fibro-plastic tumors; the tumors called *colloid* or gelatiniform; and, lastly, the tumors of bones, having *osteoplexuses* for their fundamental anatomical element.

The nature of a tissue is determined by the determination of the elements which compose it, because experience has shown that always, when a certain anatomical element exists in a tissue, this tissue possesses a certain property. Now, as these elements are not visible to the naked eye, an instrument must be employed, magnifying sufficiently to bring to light all their distinctive characters. The microscope is not, therefore, for the biologist or the physician, an instrument which he can indifferently make use of or not, as he wishes; its employment is absolutely necessary.

Accustomed to judge from exterior characters alone, pathologists should not be astonished that many of the results obtained by them are shown to be inexact or incomplete by the microscope; which, by giving a knowledge of the anatomical elements and of their texture, affords to the judgment two *points d'appui* entirely new, and shows to what these external appearances are owing. Besides, should there be contradiction between the determinations of the microscope in respect to certain tumors, as cancerous or tuberculous, and the symptoms previously attributed to these morbid products, this would indicate only that, unable to determine in a positive manner the nature of these tumors, from not having been acquainted either with their elements or their texture, the pathologist could very well attribute to cancerous or other tumors symptoms which did not belong to them. Far, then, from believing that the fault comes from the new information added to the other by the microscope, and that it must be rejected because it is in contradiction to notions previously acquired, it is these which must be modified; it is the history of diseases which must be taken up again and revised, starting from the new and much more precise notions of the tissues furnished by general anatomy.

It is urged by some against the use of the microscope, that those who make use of it obtain different results. These contradictions, however, are more apparent than real; they refer to the interpretation rather than to the form of the histological elements; moreover, they are rare, and only exist in a few accessory details. No one, at the present day, denies the existence of the globules of the blood, of the lymph, of pus, or that of spermatozoa; only it is a question whether spermatozoa are animals or not, or whether or not the globules of lymph change into the globules of blood. Is it just to ask of microscopical studies greater precision than, in anatomy, is attained by the naked eye, or than that which anatomists attain as to the length of the urethra, as to the existence of an internal abdominal ring, or in describing, in the same way, the aponeurosis of the groin, or of the perineum? It is most evident, as Broca says, that "the microscope is as innocent of the errors of micrographs, as the scalpel of those of anatomists."

The name of *cancerous tumors*, of *cancerous tissue*, is given to every tissue which contains, among its elements, the cells and nuclei called cancerous. Every tissue which presents these is called cancerous, for the nature of a tumor is determined by that of its anatomical elements; every tissue which does not contain them is not cancer, no matter what may be its exterior characters. These cells and nuclei differ from any met with in the normal tissues; they are completely heteromorphous. Although the epithelial cells and nuclei present differences in form and volume, yet they can always be recognized as epithelial. The cancerous elements differ from all those met with in the normal tissues by a much more variable form in the cells themselves, and by the greater size of their nucleus, and often of their nucleolus, which is more yellow and more brilliant; and, besides, the granulations are more abundant than in the normal cells, and they are distributed differently, from which results a peculiar aspect that none of the normal elements of the economy offer.

The most fixed, the least variable form of all the cancerous elements, is the nucleus. It is an important fact, that when anatomical elements are developed in a tissue, almost always they assume the appearance of the tissues about them. In vegetables, when a cell is developed among cells having striæ, it will be striated also; when among transparent and non-striated cells, it will have no striæ. So in pathology, in new bone the osteoplastes, or corpuscles, as they are called, are most regular next to the old bone; if a nerve cicatrizes, the tubes will be found to be most perfect near to the old; in the rest they are more flexuous, and the farther from the old the more flexuous they become. This influence of the anatomical elements already existing on those being born, is manifested also in cancer. When, for instance, the cancerous cells are developed in the liver, they quite often assume something of the general appearance of the hepatic epithelial cells, while the nucleus remains with its peculiar characters. It is thus that certain cells of scirrhous cancer in the breast have somewhat the appearance of the epithelial cells developed on the internal face of the *culs-de-sac* in glandular hypertrophy; it is thus, again, that certain cutaneous cancers have cells, having, to some degree, the appearance of the epithelial cells of the region; but the nucleus and all the characters taken together render the distinction an easy one.[1] In certain portions of the body, a cancerous mass is chiefly formed by free nuclei; as in the eye, in the lymphatics, and quite often in the liver and the brain. The *form* of the cell must not, then, be so much insisted upon; it may be spherical, or caudated, or fusiform, as in cancers of the periosteum and of the sclerotic; its structure and other characters must be studied, and, above all, the nucleus.

The nucleus of cancer is generally ovoid, though some are spherical; the circumference is seldom dentated; their medium diameter is 0.014 millimetre, or about $\frac{3}{5000}$ inch, though they are found as large as 0.025 millimetre, or $\frac{1}{1000}$ inch; and some, though few in number, as small as 0.010 millimetre, or $\frac{1}{2500}$ inch. Their size is important, for, normally, there is no nucleus so large. They do not swell in water; acetic acid renders them paler, more transparent, and it is the only nucleus thus affected; the acid acts almost as much upon the nucleus as upon the cell itself. As to its structure, it generally contains one or two nucleoli, and sometimes five or six. These nucleoli are very striking from their size and brilliancy; they resemble fat, but their tint is generally deeper; acetic acid has no effect upon them. The nucleus generally contains also some granulations.

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[1] See Robin, Histoire Naturelle des Végétaux Parasites, p. 107.

In every cancerous tumor many cells are found containing two or more of these nuclei; in an epithelial cell two nuclei are rarely seen, and never eight or ten, as is sometimes seen in cancer. Between the nucleus and the wall are found an abundance of large granulations; they are always very abundant, and on this account the cancer cell is never as transparent as the epithelial.

In addition to these cells and nuclei, characteristic of the nature of the morbid product, cancerous tissue always contains accessory elements which quite often, together, compose the most considerable portion of the tumor. It is owing to these accessory elements that cancerous tissue can present two principal varieties, called *encephaloid* and *scirrhous*, as it is of a certain softness, and of a rosy gray color; or harder, more resistant to the knife, and of a more or less homogeneous aspect. A *melanotic* cancer has been described, but the existence of the pigmentary granulations is an accidental circumstance, which can be met with in every cancerous tumor, and by no means constitutes a peculiar variety. One of these accessory elements is the amorphous matter, always finely granular, and much less abundant in scirrhous than in encephaloid, which owes its appearance to it, just as the brain does, when there is so much amorphous matter. Another element is the cellular tissue; there is very little in the encephaloid, but in the scirrhous it is often very abundant; when there is very little, the tumor is proportionately soft. There are almost always some fibro-plastic elements, and free drops of fat are often found. There are vessels, both arterial and venous, and principally in the condition of capillaries; when they are in very great abundance, the cancer is called *fungous*, but it does not constitute a variety of cancer any more than the presence of pigmentary granulations. In encephaloid cancer, it is difficult to make an injection, for the capillaries, not being supported by the tissues, give way, just as in the brain and in the mucous membranes; and again, the vessels are often closed by clots; by using a cold injection and pushing it very slowly, the veins can always be found. The encephaloid and scirrhous are the only two varieties of tissue offering, as constituent elements, the cancerous cells and nuclei; some authors add the *colloid*, but, according to M. Robin, this does not exist, at least he has never seen it; *gelatiniform*, glandular, or fibro-plastic tumors have been taken for a *colloid* variety of cancer.[1]

The best exterior character of cancer, when it exists, is the cancerous juice; it is whitish or grayish, of a creamy consistence, and of peculiar viscosity; it oozes from the whole surface of the tissue, when it is cut, and not from particular places, as in some glandular hypertrophies, where it comes from the tubes still preserved. On account of the softening of the amorphous matter of the cancerous tissue, it gives more juice some hours after its removal from the body, than directly afterwards. This juice is composed of serosity, amorphous matter, with many fatty globules, and granulations, and the cells and nuclei of cancer.

Under the name of cancer, so many tumors, which are not cancerous, have been described, that it is impossible, in existing descriptions, to recognize the symptoms belonging to those which have for their fundamental anatomical element, the cancer element. In this respect, there is a great deal to be done, and it is to be accomplished by observing with care the phenomena that accompany the presence in the economy of the cancer-element, which must be detected by examination after removal from the body. It is this confusion of different things under the same denomination, that has led to a proposal to suppress the word *cancer*, and to use in place of it, to designate the peculiar anatomical element, the word *thnetoblast*, composed of Greek words, signifying *deadly* and *germ*.

By far the most important point in the doctrine of cancerous diseases, as well in practice as in science, is that relating to the local or general nature of cancer, and of the tumors confounded with it.

For ages, the terms *malignity* and *benignity* have marked the fundamental difference between cancer and other accidental productions. It cannot be doubted that this division of tumors has exerted a most unfavorable influence on the progress of surgery. "By making of these vague and elastic terms a principle of classification, science has not done more than the ignorant, who divide diseases into those that can get well, and those that cannot; or those countrymen who classify all plants, as weeds, and those fit for pasturage." What proves still more the scientific inconsistency of such a division, is the fact that the same tumor can be benignant or malignant, as it is placed half an inch higher or lower. For instance: a fibrous tumor of the uterus gives rise to abundant hemorrhages, that exhaust the strength of the patient; this tumor, if accessible to surgical means, is extracted, and the patient cured; but if this same tumor is situated in a part of the uterus where it cannot be reached, by this is its nature changed, and from benignant does it become malignant? It is time, then, to abandon such a classification, one so little in harmony with the severe spirit that, at the present day, should reign in all the sciences of observation.

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[1] See Colloid Cancer of the Breast.

The great question in the prognosis and in the treatment of tumors, is, be it said again, the local or general nature of these accidental productions.

Cancer is, without the slightest doubt, a disease of the whole economy. Such has been the opinion of physicians since ancient times; and if the contrary opinion has been for one moment listened to, it is because patients affected with cancer were not followed sufficiently long; or from having confounded with it many affections that resemble it in some characters, but that differ in many others. Moreover, at all times, there are a certain number of physicians, who judge pathological questions after theoretical ideas, the previsions of the mind having more attraction for them, than the results of observation.

But when cancer has been studied on a great number of patients, and in all its principal varieties, unhappily the first apparition of the smallest cancerous tumor is known to be already the expression and the manifestation of a general diathesis; although the health for some time may remain still intact, and the sufferings, during the commencement, be almost nothing. Whatever be the part of the body in which cancer is primitively localized, the disease has not only a propensity to extend itself, but moreover, whether it gives rise or not to secondary deposits, its general infecting tendency is constant and always progressive until the fatal termination; unless the local accidents acquire sufficient gravity to divide sooner the thread of existence. Thus, the early and complete extirpation of a cancerous tumor is not sufficient; it will return sooner or later; and if it does not at the point primi-

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scribed, nutritive alteration. But already in this group of tumors, that no one, for an instant, would think of comparing with cancer, quite great varieties in this local manifestation are found.

Encysted tumors, having their origin in the sebaceous glands, most certainly cannot infect the economy, but they can be found disseminated over various parts of the scalp. As many as eighty of these tumors have been found on the same individual, in different parts of the body. Again, they have been seen to become inflamed and ulcerated, the bones of the head ulcerated, the meninges inflamed, and the life of the patient destroyed; yet the autopsy, carefully made, showed the disease to have remained entirely local.

Erectile tumors are sometimes multiple, but they always occupy the same order of tissues, the same organ, and remain, whatever be their origin, a disease entirely circumscribed. By suppuration and repeated hemorrhages, an erectile tumor can become a very serious affection; but, at no epoch of its existence, does it belie its fundamental difference from the general disease, cancer.

Fatty tumors, without any doubt, constitute one of the most benignant, the most strictly localized, of the accidental products; and yet, in consequence of prolonged pressure, they can become inflamed or ulcerated. In some cases, likewise, a number of fatty tumors exist in different points of the subcutaneous cellular tissue; and here is seen that variety of local state that might be named local multiplicity, and which is often confounded with a general diathesis. It is admitted that, in this case, the adipous tissue has undergone an alteration in a greater extent than at the point, strictly circumscribed, that one single tumor would occupy. But, on the other hand, an absence of alteration is found in all the other tissues, with the exception of the adipous tissue; and absence of any injurious reaction upon the economy is also found; absence, in a word, of that general toxical action of which cancer is, in turn, the effect and the cause.

In the study of fibrous tumors, are found analogous facts to those just cited. Several times, multiple subcutaneous fibrous tumors have been observed; and every one knows how often several fibrous tumors are found in the same uterus. But though, when in the uterus, the presence of these bodies may lead to repeated and abundant hemorrhages, and constitute a very serious affection; yet, when women thus affected are compared with those affected with cancer of the womb, an enormous difference is seen between the two affections, in the power of resistance of the organism, in the duration, and in the march of the disease; and the local nature of the one, in opposition to the general nature of the other, will be so well shown by the clinical observation, that all that remains for anatomical examination to do, is to confirm what was known before.

The study of cartilaginous tumors again confirms what has been said of the local nature of homœomorphous tumors. Of the number of cases reported, there are some in which multiple cartilaginous tumors existed, on one or more of the extremities But, by studying these cases, it is readily seen that, in spite of this apparent multiplicity, the disease was always local, and the health always remained good. Here, once more, is seen the difference that exists between the alteration of the nutrition of one single tissue, and the alteration of the general nutrition; between a local disease, and tumors from a peculiar diathesis.

Cancer has often been confounded with different glandular hypertrophies. Among mistakes of this kind, may be cited hypertrophies of the lymphatic ganglions; but though they sometimes acquire an enormous size, they never exercise an injurious influence on the general state of the health; and, notwithstanding the proximity of large bloodvessels, and voluminous nervous trunks, they are much more easy to extirpate than would be believed. The whole march of the disease shows its purely local nature.

Partial hypertrophy of the mammary gland is still mistaken every day, for a cancerous affection; but it is impossible to find, in a higher degree, all the differences that separate local diseases from a tumor, having its origin in a general and specific cause, than by comparing hypertrophic mammary tumor with cancer of the breast. This comparison is one of the most demonstrative of what is here maintained; namely, that to the anatomical and microscopical differential characters, correspond generally a series of clinical phenomena not less distinct.

In partial hypertrophy of the breast, sometimes one single tumor, sometimes multiple tumors, are found, and the prominent character of local multiplicity shows itself plainly in the fact, that the disease is limited to the organ itself. Not one single example of hypertrophy of the breast is known, in which secondary alterations were produced in distant organs; exception being made of the lymphatic ganglions in the axilla, that become sympathetically engorged when the hypertrophied part becomes inflamed. The general health remains unaffected; and here, again, the local nature of the disease is characterized by the fact, that the nutrition of an organ, or of two symmetrical and homologous organs, can suffer, without directly influencing the rest of the economy, inasmuch as the general nutrition, and that of all the other organs, preserve their physiological characters.

Let any practitioner now remember the *ensemble* of the clinical characters of cancer of the breast; its invading tendency, its local and general propagation, its propensity to return, the profound alteration of the general health it provokes, and no one will doubt of the enormous difference that exists between this disease of the whole economy, and local hypertrophy.

If, now, we pass to the anatomical comparison, we find that, in partial hypertrophy, the tumor is well circumscribed, and composed, in its interior, of glandular lobes and lobules; and that the microscope shows the terminal *culs-de-sac* of the gland. In cancer, on the contrary, dissection shows a tumor more diffused; in this is found a destruction of the normal elements of the gland, and the characteristic cells and nuclei of cancer are found, that a superficial examination only could confound with the glandular epithelium.

A last group of diseases that have always been assimilated with true cancer, are those vegetating tumors, those eating ulcers, that are met with on the skin, and, also, on the mucous membranes nearest to the surface of the body; as the mucous membrane of the tongue, of the vaginal portion of the neck of the uterus, of the lower portion of the rectum, and, also, of the mucous membrane of the nose.

The study of the opinions that have reigned at different epochs concerning these tumors is very instructive, as showing, on one side, how a certain practical good sense can go before scientific discoveries; while, on the other, it likewise shows how incomplete and superficial observation leads at once to intolerance, and to a false interpretation of the discoveries. The greatest surgeons of past times knew that cutaneous cancer offered a much more favorable prognosis than that of other organs; and, already, cures obtained by excision, and by caustics, were proofs of the nature, often benignant, of cutaneous cancer; a term under which were confounded the true carcinoma of the skin, and those papillary tumors and ulcers which, under so many relations, differ from it, and should necessarily be separated from it. Yet true cutaneous cancer, in malignity, and in fatal and rapid progress, yields to the cancerous affections of no other organs; and the idea, so natural, that two different affections could be confounded under the same name, did not enter the minds of surgeons.

When, however, M. Lebert showed that many of the tumors taken for cancerous in different parts of the derm, are nothing but hypertrophic or other alterations of the papillæ, of the glands, of the epidermis, and of the derm itself, this discovery was received with mistrust; and it was asserted that these tumors were cancerous, whatever the microscope might say, because they could return after an operation for their removal. Pursuing his investigations, he himself pointed out still stronger objections; he showed, not only that such tumors returned, but that the lymphatic glands, in direct anatomical connection with them, could become affected, and that the disease could progress so as even to attack the bones.

But such facts as these are far from showing the affection to be a variety of true cancer. Comparing together the structure of cancer and that of cutaneous cancroid affections, we find, in one, the substitution of a new element, in the other, an exaggeration of the normal. The march in cancroid affection is very different; and when freely removed, it either does not return, or if it does, it returns in the same region, or in the immediate vicinity. Cancroid affections will be spoken of more at length elsewhere; attention, however, would here be called to the fact, that, a tendency to return denoting that a disease is not benignant, a great difference is here determined between a local disease and a benignant disease.

This is, then, the true point of view under which the pathologist should always regard tumors and accidental products. Abandoning the old routine, which consists in considering only the benignity or the malignity of these diseases, it should always be considered, in the first place, whether a disease be general or local; this point determined, the different varieties of local diseases must still be distinguished, such as local unicity, local multiplicity, and local diffusion; and, in this last, a greater possibility of local propagation must be recollected.

The facts that the practice of surgery will draw from the just appreciation of this point of view, are immediate. They will save some patients from useless operations, and will encourage the performance of others, with boldness and with perseverance, in cases in which a less profound knowledge of pathology would, perhaps, have caused them to be rejected, to the great injury of the patient.[1]

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[1] See Lebert's memoir "On the Local or General Nature of Tumors," from which the above considerations have been derived.

CHAPTER IV.

FATTY TUMORS.—SYPHILITIC TUMORS.—AFFECTIONS OF BURSÆ MUCOSÆ.

Lipoma.

MARCH, 1854. M. Nélaton removed a globular, subcutaneous tumor, situated in the scapular region, and upon the external side of the infra-spinatus muscle. The tumor was a lipoma, which, after remaining nearly stationary for a number of years, had commenced to grow very rapidly. After remaining stationary for ten or twelve years, M. Nélaton said, they sometimes commence to grow, and acquire an enormous size. It was for this reason that he removed the tumor in this case.

A T-shaped incision was made over the tumor, and the whole mass was detached with facility from the neighboring parts. After the extirpation, the flaps were brought together, and held in place by adhesive strips. In these cases there seems to be a superabundance of integument, but it gradually retracts and returns to its former dimensions.

The wound healed without anything remarkable taking place.

A lipoma is a fatty tumor, a tumor formed by the local hypertrophy of the adipous tissue; by exaggerated multiplication of the anatomical elements of this tissue, the adipous vesicles. It is not rare, at the same time, to find these vesicles larger than they generally are, and instead of measuring 0.06 millimetre or $\frac{1}{400}$ inch, to reach the 0.15 or $\frac{1}{170}$ inch.

The tissue of these tumors offers, generally, all the physical characters and the texture of the adipous tissue; the fat being liquid in the vesicles, pressure properly made upon the tumor can give a sensation of fluctuation as distinct as that found in a collection of liquid. The usual texture of lipomas can be modified by the hypertrophy of the fasciculi of the fibres of cellular tissue, which, in the normal condition, are accessory in this tissue; or by the production of amorphous matter and of fibro-plastic elements between the adipous vesicles.

It is a debated point in surgery, whether a lipoma, after having for a length of time presented the anatomical characters proper to it, can lose them to take up those which have been attributed to steatoma; in other words, whether the affection described under the name of *steatoma* can be considered as a more advanced period, a mode of termination, a degeneration of lipoma. After stating the question, M. Nélaton says: "Let it be said at once that steatoma is an encephaloid cancer; consequently, these two affections, which have long been regarded as two periods of the same disease, are two diseases essentially different."[1]

Steatomatous, atheromatous, and melicerous tumors, commonly called *wens*, are subcutaneous encysted tumors, which contain sometimes a yellowish or whitish matter having the consistence of tallow, and sometimes an unctuous liquid resembling honey. The cyst of these tumors is formed by the thickened walls of the sebaceous glands, from which these tumors originate. Whatever be the color or the consistence of their contents, it is always formed in great part by pavement epithelial cells, very often mixed with free granulations, fatty and calcareous, and with cholesterine.

Of these tumors, the steatomatous are the heaviest, their tissue the densest, the vessels are more developed about them than about the others, and they are more susceptible of becoming inflamed and of passing into the condition of eating ulcer, which invades the neighboring tissues and even the bones of the head and of the face, according to the situation of the tumor. This peculiarity, which is often observed in epidermic tumors, has caused the belief in the primitive or secondary cancerous nature of steatomata. Their yellow color has also caused the erroneous belief that steatomata had its origin in lipoma, which, as has been explained, is of an essentially different nature.

What is called steatoma is often a hypertrophy of one or of several sebaceous glands, which, after ulceration, behave as the epithelial tumors of glandular origin, which will be spoken of under the head of *Cancroid.* On the contrary, those which, from examination with the naked eye, are called atheroma, are most generally a cystic distension of the sebaceous glands, caused by a retained hypersecretion, rather than by a hypertrophy, properly so called.

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[1] Éléments de Pathologie Chirurgicale, vol. i. p. 397.

Syphilitic Tumors (Deep-seated, of the Cellular Tissue).

November, 1851. A man with a tumor of the interior of the mouth, on the roof, at the right side. It was a hard, lumpy mass, with loss of substance in the centre, an ulcer, the edges of which were smoothly cut, and the bottom covered with a grayish pulpy layer. The edges were inflamed, and the pains were acute. It was two months since the tumor had made its appearance.

At first, this affection was thought to be cancerous, but afterwards, this was believed to be incorrect. Some years before, the man had had an indurated chancre, followed in the course of twelve months by an affection of the skin. Other reasons in favor of a syphilitic cause for the tumor, were, that it had only existed two months, and already it had a great development; cancerous affections of the mouth have a slower progress; the ulceration was not that seen in such cases; the granulations were not so very closely together, and the edges were more regular; moreover, the pains here were constant and acute, while in cancer they are lancinating, and they occur at intervals. Again, around the ulceration in cancer, as a general rule, you do not see inflammation.

This tumor yielded marvellously to an antisyphilitic treatment of iodide of potassium, with the protiodide of mercury; and the patient very soon went out well.

May, 1852. An old woman, who gave rather a confused history of her disease. She said, that about a year before, she had received a fall, in which the forehead and the nose were injured; the wound of the nose was very slow in healing. She went, therefore, to the Hospital St. Louis, where baths of sulphur were prescribed; rather queer treatment for a simple wound of the nose. Afterward she consulted a physician elsewhere, who gave her pills to take for a long time; this also was very unusual treatment. At the same time, she had had pains in her limbs, which disappeared while taking the pills.

This patient presented an ulceration in the middle of the nose, on its dorsal surface, where the cartilage and the bone are joined. In the centre of this ulcer was a small orifice, from whence a purulent discharge issued. In the cheek were two depressions, in the bottom of which were granulations, covered by scabs. Besides, under the chin was found an ulcerated tumor. Towards the upper part of the canine fossa of the left side, in the interior of the mouth, was a small tumor, which had great mobility.

The two fistulous orifices on the cheek were not dental fistulæ, for the woman had no teeth, and the alveolar ridge was completely absorbed; there was no deformity, nothing to indicate that a root had remained; moreover, when a dental fistula exists, it is always easy to find its course, by an interstitial cord.

As to the veritable cause of all this, M. Nélaton was inclined to believe that all the symptoms were manifestations of a syphilitic diathesis. The fistulous orifices were the result of *gummous tumors*, that had passed through their regular evolution.

When, in a patient with a tumor of the mouth, there are no antecedents to lead you to suppose it to be syphilitic, incline always to the supposition that it is caused by a hypertrophy of the buccal glands. There is also another variety, the result of an accumulation of mucus in these lacunæ, which exist in the interior of the mouth; these are demi-transparent, sometimes as large as a very large hazel-nut, and they contain a liquid resembling the white of egg. Beside these, there are also the syphilitic tumors, in which, by examination, you find suspicious antecedents.

After an antisyphilitic treatment, of iodide of potassium, had been continued for but five days, there was scarcely a trace of the tumor, situated in the thickness of the cheek, near the superior part of the canine fossa.

At the same time, there was a patient in the male wards, who had a subcutaneous syphilitic tumor, on the anterior and external part of the thigh. Its thickness was considerable, and it was as large as the hand.

After a treatment of twenty days, the usual preparations of mercury and of iodine being used, the tumor had disappeared.

In the same month, a man came to the hospital on account of an affection of the knee.

Eight months before, there was a slight swelling about the left knee, accompanied by the appearance of a small tumor, situated one and a quarter inches above the patella.

This tumor, at the time of his entrance, had the form and the size of an almond; it was firm, not fluctuating; it had no adherences, for the integuments could be raised over it, and it did not adhere to the tendon of the extensors, for when these muscles were contracted, movements could still be impressed upon it. There was some effusion into the articulation, but it was not considerable.

The important point in the case was, that this tumor, this induration in the cellular tissue, simulated a foreign body existing in the joint. M. Nélaton said he recollected upon one occasion that Bérard was arrested by M. Marjolin, at the moment he was about to plunge his bistoury into a patient, mistaking one of these indurations for a foreign body.

This tumor, M. Nélaton said, was syphilitic; he had already seen them in that region, and they disappeared under the influence of iodine and of mercury. In some cases, when, as in the present one, it was impossible to find any syphilitic antecedents, this treatment had cured them.

This patient went out to follow the appropriate treatment at home.

June, 1853. A man, in the prime of life, with an induration situated in the middle of the calf of the leg; it was a cord as thick as the finger, descending, vertically, four inches in length. The integuments were not altered, but they could be felt to adhere to this cord.

When was this cord developed? You might have been led to suppose it to be the result of a phlebitis, but anatomy shows that no vein lies there normally, with a course perfectly rectilinear. Moreover, at no period had the patient had pains, or any of the symptoms of phlebitis; and again, the brown coloration of the parts caused by the inflammation of a vein generally lasts a long time. Besides, there was no swelling of the parts below, which is very common, though not invariable. The affection, therefore, was not in the vein; nor was it in the lymphatics, for they turn around the tibia.

This affection was not in the aponeurosis enveloping the leg, nor in the muscles. The muscles could be felt to move, and still the tumor remained immovable. If it had been in the aponeurosis, the tumor could not have been displaced as it could in this case, for you cannot impress upon these aponeuroses of the muscles a movement of "backwards and forwards."

This tumor, M. Nélaton said, was not exclusively in the subcutaneous cellular tissue; it appeared to him to be connected with the most deep-seated surface of the derm.

This man had had indurated chancres, roseola, loss of the hair of the head, and engorged cervical ganglions. Still, these tumors must be diagnosed as syphilitic, sometimes, without finding a chancre; you cannot always find that.

These syphilitic tumors do not give much pain, but they inconvenience the patient; at last, they soften and open, and the normal tissues, that have become gangrenous, can be extracted. After that, healthy granulations form, and, sometimes, the ulcer cicatrizes. This has led surgeons into the mistake of calling the affection a *chronic phlegmon*. Some say that this course of things accomplishes itself fatally; but it is not true; antisyphilitics, above all, those for the third stage, for the tertiary symptoms, bring about a cure.

By giving the usual preparations of iodine and of mercury, in a week the cord would be found fragmented and more supple; in twenty or twenty-five days, only some slight traces would still be found.

The affection is a very common one, and very variable symptoms must arise, from the possibility of its occurring in a multitude of regions; and errors of diagnosis must often be caused by it.

This patient, after taking, every day, thirty grains of iodide of potassium, and one of iodide of mercury, went out at the expiration of eight days. There was scarcely a trace left of the cord, which adhered to the deep-seated surface of the derm. The cord, at first, could be seized and held up in the fingers, but this was then impossible; in a few more days, it would all have gone.

These indurations give rise to most singular mistakes; but M. Nélaton said he had never, as yet, seen any simulating a vein containing a coagulum.

January, 1854. A young woman, twenty-three years of age, entered the wards for an ulcer of the leg.

On the upper part of the calf of the left leg, an ulcer existed the size of a silver dollar; the edges seemed loose; the bottom was a grayish mass; in some places you could see small grayish eschars; in others small yellowish lobules; this was the cellular adipose layer; no healthy granulations were to be found. The parts around this ulcer were indurated, and this induration appeared to be seated in the subcutaneous cellular tissue, and also in the deep layers of the derm; for the skin did not slip, and it could not be pinched up. These indurated parts, however, did not have any very great thickness. When the patient was placed so as to be in an easy position, by extending and flexing the leg, the gastrocnemii muscles slipped perfectly well under the indurated mass. She said she had no nocturnal pains in the part; she suffered only after walking a great deal.

The girl stated that, six weeks before, she felt a hardness there, the skin became of a violet color, and the epidermis fell off in pellicles; the skin became thinner, and at last an ulcer formed. At once, M. Nélaton said he thought this induration to be syphilitic; to be what is called a gummy tumor; a bad term, for he never had seen anything like a solution of gum.

Five years before, she had had chancres, which were treated locally, and by general medication with a syrup of mercury, as M. Nélaton thought; for the patient had never had any manifestations of general disease, no falling of the hair, no roseola, &c. It is very singular that a chancre, at the end of five years, could produce this symptom, and no others before it; it could only have occurred, according to M. Ricord, by her having taken mercury.

Tumors of this kind are often seen in the wards, but none had ever been there so advanced. The affection is what some authors call *chronic phlegmon*, because they do not believe it to be syphilitic; but, treated by antisyphilitics, it heals wonderfully.

This patient took, the first day, sixteen grains of iodide of potassium; the dose was gradually increased until, at the end of six days, she took forty-eight grains; this dose was continued for about one week, when the girl left the hospital. At that time she was in a better condition than when she came in, but the ulceration had not yet healed.

July, 1853. A man, thirty years of age, entered the wards with several affections, which were believed by M. Nélaton to be syphilitic. He said that he had never before had any syphilitic symptoms; never clap, nor chancres, nor spots upon the skin. That these affections were hereditary symptoms, M. Nélaton thought admissible.

Six years before, this patient was sick for the first time; blood and pus came out when he blew his nose, and the air passed through with difficulty, above all, on the right side. He said pieces of bone had never come out, nor had the odor of the discharge been disagreeable. This running lasted three weeks. At the same time, he was unable to see clearly on the right side, and, on questioning him very closely, it was found to have been owing to swelling of the upper eyelid, which fell down over the eye. Since then, at least once every year, exactly the same series of phenomena has been repeated.

Three months before coming to the hospital, this patient commenced to have pain at the level of the anterior and superior parts of the left tibia; the pain was followed by the formation of a tumor. There was a tumor there, as large as half a hazel-nut, placed upon the tibia, with which bone it formed one mass. It was very hard, and evidently osseous; or, the deep-seated layer of the periosteum was infiltrated with plastic matter. Besides, there was upon the upper part of the arm a tumor the size of a half dollar, and ulcerated in the centre; the ulcer was nearly as large as a quarter dollar, having a scab covering an ulcerated and dry bottom.

Evidently, M. Nélaton said, he had here to do with a syphilitic manifestation, and one he did not hesitate to declare hereditary. Besides, the arm could not be extended, and because the biceps was too small; over that muscle there was not the slightest change in the skin, and you could see nothing. There was no induration of the muscle, as there often is. There was no pain on pressure, nor on extension, which is another thing, and sometimes the tension of a muscle gives pain when pressure does not. The pain of tension is situated particularly at the point of union of the fibrous tissue with the body of the muscle. The man could bend his arm with as much energy as before. The affection was a syphilitic contraction.

The diagnosis of the case was made more clear by the success of the antisyphilitic treatment, under which the condition of the patient rapidly improved.

Gummy tumors, microscopically examined, are found to be formed of cytoblastions, of fibro-plastic elements, and of amorphous matter.

Cytoblastion is the name given by M. Robin to a kind of anatomical element, offering two coexisting varieties; characterized, one, by its form of free nuclei, spherical, rarely a little ovoid, 0.005 millimetre—about $\frac{1}{5000}$ of an inch in diameter, with small, dark-colored granulations in the interior, but without nucleolus, properly speaking; the other variety, always much less abundant, offers the form of a spherical cell, not at all or but slightly granular, surrounding a nucleus, resembling the free nuclei. These elements are found, in very small quantity, in the thickness of the tissue of the cutaneous derm, that of the mucous and serous membranes, and in the pulmonary parenchyma. In the diseased structures, they are constantly found in the following productions: fungosities, or vascular tissue of syphilitic *plaques muqueuses*, of condylomata, of chancres, indurated or otherwise; in syphilitic gummy tumors; in some cancers; in many fibro-plastic and epithelial tumors; in the gray or yellowish granulation of the inflamed pia mater; in what are called gray tuberculous granulations of the lungs, often met with in the affection called *acute phthisis* (they have certainly, in this case, been mistaken for the corpuscles of tubercle; although acetic acid darkens them, while tubercle is rendered pale by it); in the gray or yellowish granulations of the kidney, in certain forms of nephritis; in the demi-transparent or fungous productions around white-swellings; in the vegetations, polypiform or not, of the mucous tissues, of those of the bladder among others. They are found, moreover, in considerable quantity, in the soft, pulpy, grayish substance of chalazions, which are almost entirely composed of them, as well as in the walls of cysts of the conjunctiva. Their form, their small size, their dark outline, the action of acetic acid, distinguish them from the fibroplastic elements, which they often accompany; and from the corpuscles of tubercle, with which they are rarely seen, in the small yellow tubercles of the lungs.

With some very rare exceptions, M. Ricord considers these gummy tumors to be the consequence of a constitution profoundly changed, and under the influence of syphilitic cachexia. Their growth is very slow, and without pain; five, six, or many more, months are often required for them to reach their term. They contract adhesions, and until then very hard, they become more and more fluctuating. The skin, which so far had remained unaltered in texture and in color, becomes of a reddish-brown violet hue; it becomes thin, is perforated, and discharges an unhealthy pus, carrying with it portions of the tissues. Although they are most frequently seated under the skin, and generally also in the external regions of the limbs, and there where the cellular tissue is most dense, they are also often met with in the cavity of the mouth, in the thickness of the velum palati beneath the mucous membrane of the pharynx, and in the thickness of the tongue, which then seems to be stuffed with small nuts, which might be taken for scirrhous lumps, and which, after their softening and ulceration, resemble cancer so closely as to be easily mistaken for it. The treatment M. Ricord employs, is iodine, aided by the bitter tonics; the iodine given under the form of iodide of potassium, in doses gradually increased to forty-eight grains a day, which he considers the medium dose; with which you obtain the therapeutic effect, without the pathological. The regimen should be *globulizing;* wine, gayety, sunshine, fresh air, and exercise. When the tumor has opened, the best dressing is a solution of iodine in distilled water, with enough iodide of potassium to keep it in solution.

Affections of the Bursæ Mucosæ.

These closed sacs, known commonly as bursæ mucosæ, were always called, and with more propriety, by M. Nélaton, *bourses séreuses;* the former designation, however, will be made use of.

All the cases observed in the wards, whether occurring in the bursæ, normal, or accidental, situated under the skin, or under the muscles, or in the bursæ serving as sheaths to the tendons, are placed here together. Of course, the more extensive surface of the tendinous sheaths, their being bound everywhere by a fibrous inclosure, the presence of an important organ whose movement it is almost impossible to prevent, and, finally, the neighborhood of the articular synovial membranes, give to these affections a more serious character than to the others; there is, however, a very great analogy between them.

For the formation of the subcutaneous bursæ mucosæ, it is sufficient that the skin, at a certain place, be subjected to rubbings, to oblique pressure, causing it to slide over the subjacent parts; little by little, the areolar tissue is stretched, some of its fibres torn, and a cavity is formed. As a general rule, they are found in every part of the body where the skin covers an osseous projection; as behind the olecranon, before the patella, or at the acromion process. The mechanism of their formation shows that they can form in places where the integuments are generally immovable, but may happen to be frequently displaced by movements required in certain professions; for instance, a cabinet-maker, who often presses his instrument against the sternum, can have one there, and their inflammation can give rise to purulent collections on the chest, very difficult of diagnosis, as will be seen in cases reported under the head of Abscess.

Cases where the Bursæ of the Wrist or of the Hand were affected.

January, 1852. At Nos. 5, 13, and 16, of the male wards, were three cases of a disease not often met with, namely, cysts developed in the cavity formed at the wrist for the flexors of the hand.

In order that the class might well understand them, M. Nélaton recalled to their recollection the anatomical disposition of the parts in that neighborhood. In the first place, as a general rule, there are two bursæ mucosæ, or synovial sacs, at the wrist, under the annular ligament; one of these is intended, especially, for the tendon of the long flexor of the thumb; the remaining eight tendons have but one synovial sac, which sends a doubling between the superficial and deep-seated flexors of the fingers. This bursa in the thumb, extends as far as the insertion of the long flexor, and, in the little finger, the phalangian portion of the flexor tendons is lubricated by a synovial membrane prolonged from the common bursa at the wrist; in the index, medius, and ring-fingers, however, the phalangian portion of the tendons has a separate synovial membrane, the bursa mucosa at the wrist scarcely extending beyond the annular ligament.

The affection of the synovial membrane in these three cases was at different stages. In the patient at No. 5, there was difficulty in flexing all the fingers, and this had existed first, for a short time, in the thumb alone. He complained of pains aggravated at night, situated in the forearm, and extending up as far as the armpit; these pains, which were in the course of the median nerve, at night, were so violent as to prevent him from sleeping. At the wrist, there was engorgement, but no evident sign of effusion. In this case, the disease seemed limited to its first degree.

At No. 16, the disease was at its height. Here, at the inferior portion of the forearm, existed a tumor, projecting chiefly towards the cubital edge; in the palm of the hand, in place of an excavation, was a projection, caused by a soft supple tumor, like the one on the forearm; these two tumors could be made to empty one into the other. In this case, there was effusion in the synovial sac of the tendons. A peculiar crepitation was very perceptible in this case, and this sensation has been explained in various ways; according to some, it is owing to the contact of the small bodies, the small corpuscles, like grains of rice, which sometimes form in the synovial membranes; but the sensation has been met with in cases where none of these bodies existed; others teach that it is owing to the passage of the synovial liquid through a small opening. M. Nélaton believes that it may be produced by the movement of the tendons; by their rubbing against the edge of the ligament, as the bow of a violin against the cords. This patient had pains, with the characters of neuralgic pains, ascending the arm, and the cubital nerve was indicated in pointing out their position.

In the third case, at No. 13, there was nothing in the hand; the affection was entirely upon the forearm. A partition sometimes divides these two portions of the bursa at the wrist. In this case, perforation of the skin had resulted from the great distension, and the contents of the bursa had been evacuated. The termination of these tumors by perforation is very rare; as a general rule, they remain a long time.

There is one circumstance which must have attracted attention in these three cases, and that is, that although the bursæ are isolated, yet they were seen to be simultaneously affected. In two of these three cases, the disease commenced in the bursa of the thumb, or the one at the external side of the arm; in the third, in the bursæ of the fingers, or the one at the internal side; and in all three, both were very soon attacked. This circumstance is simply owing to their being in the neighborhood of each other; it is what M. Nélaton called a *question de voisinage*. The same thing is true of the pains; the nerves in the neighborhood are pressed upon by the effusion.

The first of these cases got well almost immediately upon the application of *sinapismes volantes*.

The second case had been successfully treated six months before, by applications of alcohol; the affection had, however, returned. They were again made use of, and with marked benefit; in two days, the pains had disappeared, and the effusion gradually followed. This application of pure alcohol is painful; the epidermis is raised by it; it produces true vesication.

In the third case, in which perforation had taken place, blisters were made use of, but without producing any great amelioration; after them, cauterizations over the course of the tendons were practised, but without any marked benefit. After the patient had been nearly six months in the wards, with some hesitation from doubts as to the innocuity of the proceeding, injections of iodine were made use of, and under their influence the sac rapidly healed, and the fistula closed.

November, 1853. A young man entered the wards with an effusion into the bursa at the wrist, accompanied by the peculiar crepitation felt in these cases. *Sinapismes volantes* were made use of one day, and the next, every sign of the affection had departed.

February, 1853. A young man, who was a shoemaker; his profession, therefore, would expose him to injuries of the sheaths of the flexor tendons, by reiterated pressure upon them in order to push the instruments they work with through the leather. Some years before, a tumor had formed in the palm of the hand: he fell upon it, which caused a great deal of pain, and, at last, opened itself at two places. These openings, after some time, closed, but a swelling had always remained in the hand.

When he came into the hospital, in the palm of the hand, in place of the usual hollow there, there was an elevation which effaced the depression between the thenar and hypothenar eminences, and even encroached upon the latter. This swelling continued upon the forearm, and there, where in persons not fat, alongside of the anterior radial muscle, there is a depression, none existed in this case. In the hand, the existence of a tumor could be recognized, harder than liquid, harder than a lipoma, and also above the annular ligament upon the forearm. These tumors, above and below the ligament, seemed to be fixed: but, by further examination, they were found not to be absolutely so: they obeyed the movements of the tendons of the flexor muscles. These tumors were quite painful under pressure, and pressure was painful all along the thumb, and also all along the little finger, as far as their last articulations. These two fingers could not be closed without assistance: and, as in all these cases, the patient shut his little finger by placing the ring-finger behind it. This young man had pain along the course of the median nerve, even as far as the armpit.

In this case, are seen the effects of inflammation of the bursæ mucosæ, or sheaths of the tendons. In this patient, they had been inflamed, suppuration and external openings had taken place, and the sheaths had been partially obliterated, engorged, and hardened. The pains were owing to the position of the median nerve, there enveloped by the two inflamed synovial membranes.

Here, M. Nélaton thought that the treatment of chronic inflammation of the joints must be employed; for this inflammation has a tendency to advance, to communicate itself to the parts in the neighborhood, and such patients may lose the limb. A number of flying blisters would first be used, and if they did not answer, the cauterizations made use of so often, and with such great success, in cases of inflamed joints, would be had recourse to.

This patient became tired, and left the hospital before it was possible for the treatment instituted to have had any notable effect upon his affection.

May, 1852. A young woman, with a tumor situated upon the superior half of the second phalanx of the forefinger of the right hand. The tumefaction was considerable, occupying almost exclusively the palmar face of the finger. When it was palpated, the characteristic crepitation of the tendinous sheaths, the feeling as of starch pressed between the fingers, was very perceptible. This sensation, in this case, M. Nélaton said, he considered to be owing to the existence of those small hydatiform bodies, which are sometimes found in the bursæ mucosæ.

In regard to the treatment of this tumor, a small opening might be made into it, and a solution of iodine injected; the presence of these foreign bodies, however, was to be dreaded, and being afraid to leave them, M. Nélaton said he preferred to open the tumor largely, and, afterwards, keep the parts constantly irrigated by cold water, for five or six days. This would be done in order to prevent the occurrence of inflammation in the bursa, which is so dangerous.

The small bodies, of which a large number were extracted, were white and rounded; they were compared, by M. Nélaton, to boiled grains of rice.[1] The opening made into the part healed without any accident.

January, 1852. A young woman, with a small tumor situated upon the palmar face of the thumb, above the articulation of the second with the first phalanx. The tumor was the size of a large pea, and movable with respect to the integuments, and also with respect to the deeply-seated parts; but these movements were not very extensive. The tendon of the long flexor of the thumb could be moved without communicating the slightest movement to this tumor. The sensation it gave to the finger was that of a firm body, but it did not possess that hardness which gives the idea of a solid body. The sensation experienced by the touch, was that of extreme distension, and not of hardness of tissue; it seemed to be a small sac full of liquid.

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[1] The *foreign bodies* here mentioned were not clearly pointed out before the beginning of this century; they were observed about the same time in England, by Sir Astley Cooper, and in France, by Dupuytren. Dupuytren believed them to have a rudimentary organization, and classed them among the hydatids. Brodie considers them to be formed of coagulable lymph, which, at first in irregular masses, has afterwards, by the movement and the pressure of contiguous parts, been divided into smaller fragments; and finally, by frequent contact with each other, these fragments have acquired consistence and regularity. In the museum of the Pennsylvania University are two small jars containing specimens of these bodies, which have been labelled cartilaginous bodies, by Professor Horner. A microscopical examination of some which were extracted from the sheath of the flexors under the annular ligament at the wrist, in February, 1855, by my father, would go to support the opinion of Brodie. The bodies were masses of amorphous, coarsely granular matter, with some appearance of fibres, particularly while being acted upon by acetic acid, which completely dissolved them.

This tumor was of the class called ganglionic. According to M. Gosselin, the synovial membranes are provided with small appendices, in the form of *culs-de-sac*, opening into their cavity. These crypts, or synovial follicles, as they might be called, are two, three, or even five lines deep, and, by pressure, the synovia they contain is forced into the joint. The existence of these crypts once well established, it becomes very easy to understand the pathogeny of the cysts called ganglions. The obliteration of the orifice of one of these crypts is sufficient to explain their formation. That of the subsynovial corpuscles is to be explained in the same way; the ganglions only differ from them by their size; in their seat, their connections, and their contents, they are the same.[1]

These tumors are generally supposed to be formed by a hernia of the synovial membrane, lining the osteo-fibrous sheath of the tendons, taking place through an opening in the fibrous bands; and the very small pedicle of which becomes obliterated.

The treatment of this tumor would be very simple; by sudden pressure it would be ruptured, and the synovia contained spread through the neighboring tissues; by compression, it would be prevented from forming again.

This operation was not followed by any accident, and was completely successful.

March, 1854. A young girl, seventeen years of age, a mantuamaker, with an affection of three years' standing, upon the palmar face of the middle finger of the right hand. She said that, at that time, the finger had become larger, and red, and hot; and that was all the information she could give about it.

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[1] The memoir of M. Gosselin, entitled *Recherches sur les Kystes synoveaux de la Main et du Poignet*, is to be found in the *Archives Générales de Médecine* for the year 1851, p. 111.

When the finger was examined, it was found that the affection was entirely confined to the palmar face of the finger; upon the back there was nothing, and also upon the greater portion of the sides. The first phalanx was intact; its form and volume were normal; there was no alteration appreciable to the touch; the same was true of the third; but the second was a little augmented in size. M. Nélaton said that, every day, the surgeon is led into error by appearances of swelling in bones; and in this case, although the bone seemed, to the touch, to be double the size of that of the other hand, it was in reality but very slightly larger. On the palmar face of this phalanx was a swelling, perfectly circumscribed and cylindrical, resembling another finger superadded. In a line with the middle finger, in the palm of the hand, just four-fifths of an inch from the digito-palmar commissure, were two indurations, two small nodosities.

One thing about the swelling on the medius was striking; namely, its limitation to the palmar face of the finger; we have, in that part, the bursæ mucosæ of the flexor tendons, having precisely the same anatomical limits. This most probably had been the order of the phenomena; there had been first an affection of the bone, the second phalanx, in the neighborhood of the sheath of the flexors; perhaps a caries, perhaps a tubercle, was developed there; at all events, there had been inflammatory action; the sheath in contact with it had become inflamed, tumefied; fungosities had formed, and the conditions then existing had been the result; fungous alteration of the synovial membrane, and of the cellular tissue around it.

What were the nodosities found in the palm of the hand? There is a strange affection of the hand, to which M. Nélaton has had occasion to pay particular attention. It acts in this way: the patient seizes an object by closing his hand, and afterwards finds himself unable to open it; and yet, all the articulations are perfectly healthy. In order to open it, he makes use of his other hand, and then it opens with a spring, as if a catch had been loosened; or else he makes use of another finger of the same hand, placing it under the one which is *caught*, and pressing it open. There is a resistance; as soon as it is overcome, the finger opens without difficulty. Seeking to account for this affection, M. Nélaton found it always to be accompanied with the presence of the nodosities seen in this case; they are like small grains playing in the sheath of the tendons, when the fingers are opened and closed. As the finger moves, the nodosity suddenly disappears, and the disappearance of the nodosity is simultaneous with the giving way of the catch, checking the movement of the finger. What are these nodosities, and what are the obstacles by which their movements are arrested? The knowledge of the normal anatomy of the parts enables us to answer.

Just below the place where the palmar aponeurosis divides into four appendices for the four fingers, it is strengthened, and the spaces left between its divisions filled up by transverse fibres, going from one side of the hand to the other, and particularly strong at the first, the middle, and the ring-fingers. This band corresponds exactly to the glenoid ligament of the metacarpo-phalangian articulations, and to a transverse line passing along the transverse portion of the first fold, in the palm of the hand, above the one between it and the fingers. The inferior edge of this bandlette never reaches as far as the fibrous sheath of the fingers; there is always an interval of four or five lines between the two, in which the synovial membrane is only separated by loose cellular tissue, from the superficial fibres of the palmar aponeurosis, which pass in front of it to terminate at the deep surface of the skin situated over the digito-palmar fold, and on the sides of the first phalanx. It is exactly when the nodosity is at this interval that the movement of the finger is arrested; and when it has suddenly disappeared, by slipping under the fibrous bands, the finger moves as usual; the check is removed.

These nodosities might be supposed to be situated in the tendon itself; for, in certain places, the tendons do present a marked thickening, or even a sesamoid bone is found in their interior. But this thickening of the tendons is never observed but in certain places, and they are in parts where the tendons are exposed to rubbings, or to considerable pressure. Now, this was not the case in this patient, nor in others that M. Nélaton had met with; the skin of the hand was tender, supple, and free from every kind of callosity. As to the thickening of the tendon by the propagation of the inflammation existing lower down on the finger, that was not to be supposed; for, every day, tendons and ligaments are seen in the midst of inflamed tissues without their tumefaction being observed. It should rather be believed that, in consequence of the inflammation, there had been a production of false membranes, and these had become applied on the surface of the tendon, and thus formed nodosities.

For the treatment of this affection, this check in opening and shutting the finger, admitting what is said above to be true, nothing is more easy than simply to enlarge the fibrous ring, by a subcutaneous incision, and thus allow the nodosities to slip easily up and down. This treatment M. Nélaton had never practised, for the cases he had already seen had all been unwilling to submit to it: in them, small blisters had been frequently applied, but with no beneficial result. M. Nélaton said no more about this curious affection, referring those who wished to know more about it to a memoir on the subject, in the *Archives de Médecine*, for 1851.[1]

In this case there was such disease in the second phalanx of the finger, that it would be necessary to disarticulate it; and it would be proper not to be satisfied with that, but to prolong the incision upon the flexor tendon and excise it beyond the nodosity. A line drawn from the commissure of the thumb, transversely across the hand, marks the limit of the superficial palmar arterial arcade, so that there need be no fear about involving it in the incision.

The examination of this phalanx, after its removal, was strikingly confirmatory of what M. Nélaton had said about the facility with which the surgeon is led into error by the appearance of swelling in bones; although the phalanges are as easy to explore as any other bones, yet this second phalanx, that had seemed so much increased in size, was found to be scarcely larger than the one in the other hand. At the end where it was enlarged, there was a slight denudation, very near the articulation with the first phalanx; the distal extremity was perfectly healthy. When the sheath of the flexor tendons, in front of this phalanx, was opened, it was found to be filled by a tissue of an encephaloid appearance.

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[1] The memoir, entitled "Researches on a Peculiar Affection of the Tendinous Sheaths of the Hand, characterized by the Development of a Nodosity upon the Course of the Flexor Tendons of the Fingers, and by the Hindrance of their Movements," is in the *Archives Générales* for 1850; it is in the 24th vol. of the 4th series, p. 142.

In giving it this name, M. Nélaton said, he did not wish to imply that the affection was cancerous, for he did not, in the least, think that the lesion was one capable of reacting on the economy and of producing cachexia; the affection, he said, was a vast articular fungosity.

This affection of the tendinous sheaths, M. Nélaton said, had never been described.

This patient recovered, without accident, from the amputation.

Behind the Ligament of the Patella.

November, 1852. A young man entered the hospital, laboring under an affection of the knee. The tibio-femoral articulation itself was healthy, but there was a large effusion in the bursa mucosa, or synovial sac, situated under the ligament of the patella, and separating it from the portion of the anterior tuberosity of the tibia upon which it glides.

The patient was put to bed and applications of alcohol were made over the seat of the effusion by means of compresses saturated with that liquid; the next day the effusion had greatly diminished. Whether this effect was to be attributed to the repose of the part, or to the alcohol applied, M. Nélaton said he could not say, but he desired to call attention to the influence of alcohol as a resolutive liquid. As to himself, he placed no confidence in the greater part of the liquids called resolutive; in the *eau blanche* (the solution of subacetate of lead), for instance; the only one he really had confidence in, is alcohol. He has experimented with all of them, and cold water had just as much effect.

The spirits of camphor he thought he had noticed to have some effect, but only in proportion to the alcohol it contained. In some cases it has appeared to him that the repeated application of alcohol acted as resolutive in phlegmons, in the pustules of ecthyma, etc. In one case, of a woman who for six years had been troubled by the formation of the pustules of ecthyma in the ears, he had caused her to instil alcohol into them, and since then, or for the space of a year, she had had no more. He said he thought the application would be of service in erysipelas.

This patient, in a few days, was well.

March, 1852. A boy, sixteen years of age, slender in his appearance, but very energetic in his movements, entered the hospital with considerable tumefaction of the knee. Fifteen days before, he had fallen upon the knee; he continued to work for the rest of the day, and the following day also he began again, but he was forced to leave off before the day had finished; he went to his room to bed, and had remained there until he was brought to the wards. There, he was lying upon his back, the right lower extremity in a state of abduction, not very decided, and the leg flexed upon the thigh.

The knee was swollen, the protuberances existing there were hidden; the tumefaction was, above all, very pronounced towards the anterior portion. By palpation, this swelling was found to be caused by the presence of a liquid.

In the interpretation of these phenomena, it was necessary to know, in the first place, if there was a communication between the liquid causing this tumefaction, and the cavity of the joint; in cases where the patella is fractured, this communication exists. It was necessary, therefore, to make a careful examination of the patella; and, in order to do this, on account of the pain the boy suffered from the handling of the parts, chloroform was administered to him. There was, at about the middle of the anterior face of the bone, a large depression, which at first would readily be mistaken for a fracture, but a further examination showed it to be caused by effusion that had taken place about it. The injury inflicted by the fall was limited to a contusion. There had been, M. Nélaton thought, an effusion of blood into the bursa mucosa situated under the ligament of the patella; the patient had continued to walk about, and inflammation had taken place, which had been extended, in a slight degree, to the synovial membrane lining the knee-joint.

Leeches were applied about the articulation, and afterwards blisters were made use of. Under this treatment, the effusion in the joint disappeared; but the swelling in the bursa under the ligament of the patella still remained. Into the most projecting portion, on the internal side, a puncture was made and the contents of the abscess were evacuated. The patient went out at last, well, or with but some slight excoriations from the blisters that had been applied.

In June, 1853, he again entered the wards. At the external part of the knee, under the external border of the ligament of the patella, was a fistula; and there was also another corresponding to the internal border. With some difficulty, a probe was made to pass from one opening to the other, underneath the ligament; the fistula went from one side of the knee to the other, and it was so placed that its contents were with difficulty discharged. Another counter-opening was therefore made upon the internal side of the knee. Iodine was used as an injection, the leg was extended, and rendered immovable by dextrine bandages, and compression was kept up upon the ligament. By these means, the fistula was rapidly healed.

Before the Patella.

May, 1853. A man, about forty years of age, who worked as a common laborer, principally in loading and unloading vessels. He was frequently employed in rolling hogsheads, and in doing so, often struck his knee, and this had resulted in the formation of a tumor there, before the patella. For a long time, he said, it had remained no larger than the end of the thumb; it was hard, and did not hinder him from working; recently, however, it had increased in size, and annoyed him so much that he came to be relieved of it.

The tumor was two and a half inches long, one and four-fifths wide, and two and one-fifth high; it looked, in its shape, exactly like an egg cut in half in its long diameter, and placed immediately before the patella. It was fluctuating, and most plainly so. When the fingers were pushed into it, the presence of small bodies, hard like cartilage, could be detected, and, besides, at the parts of the tumor corresponding to the edge were some hard places. A candle, properly placed, showed it to be transparent.

There could be no doubt about the nature of this tumor; it was caused by an effusion of liquid into the bursa mucosa normally existing before the patella, and containing some lumps (*grumeaux* was the word used: it means *clots* or *lumps*). These grumeaux are like the fibro-cartilages, and smooth, as if covered by a serous coat. Most modern authors believe—and this applies also to foreign bodies found in an articulation—that these bodies are developed in the subserous cellular tissue; they gradually project more and more into the cavity; the serous membrane covering them by degrees, forms a pedicle, which may be as long as the finger, and at last the pedicle becomes detached, and the body falls loose into the sac.

What is the proper treatment for this affection, usually known as *hygroma?* If Boyer, one of the best authorities, be consulted, it will be seen how much he speaks of resolutives. But the more he saw of their employment, the more, M. Nélaton said, he doubted as to their efficacy. The surgeon is obliged, in some cases, to make use of them, in order to satisfy his patients; but without saying what he was using, he has again and again tried all of them, and simply cold water, and never has he been able to perceive any difference in the effects. And what is true of effusions into the synovial membranes, is true likewise of ecchymoses, of contusions. He has made experiments in bruises upon the same individual, at the same time, and these experiments, repeated a great number of times, have shown him that, whatever was the resolutive, there was no difference in the result, not the *slightest.* If anything was of any service, it was compression.[1]

In this case, it was not likely that temporization could do any good; the tumor was old, and the walls had become very thick. The patient experienced considerable annoyance from it, even in walking. It was thought proper, therefore, to open the cyst, and having allowed the liquid to escape, to throw in an injection of iodine; the presence of the foreign bodies was not considered to contraindicate this method of treatment.

After the injection of the solution of iodine, the sac became again filled by an effusion. This swelling, after the expiration of a few days, commenced to diminish, but the patient left the wards before it was possible to say whether or not a cure could be effected.

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[1] Upon other occasions, as may have been noticed, M. Nélaton expresses confidence in the beneficial effects of alcohol as *resolutive.* It is very different, however, in its action, from lead-water and other liquids, usually called resolutive; applied, as he recommends, it produces vesication; the whole of the epidermis, with which it comes in contact, being raised in a blister.

Affection of the Bursa under the Tendon of the Sartorius.

January, 1852. A young man, who had, it was said, a bruise of the left knee, caused by a kick of a horse.

The form of the knee was regular; there was no tumefaction; all the bony projections were normal; there was no ecchymosis; no trace of contusion. There was pain, not spread everywhere about the joint, but situated at the tendinous expansion (called *patte d'oie*) of the sartorius, gracilis, and semi-tendinosus, for their insertion into the tibia. This pain might be owing, M. Nélaton said, to the inflammation of the bursa, which facilitates the gliding of the tendinous expansion. When the leg was flexed and extended, there was a *creaking*, as when the tendinous sheaths are inflamed, a rubbing accompanied by crepitation. Another important point was, that the position in which there was less strain upon the tendons gave less pain; a middle position, between flexion and extension, in which there was least tension. The bursa being compressed by the tendons, could not project, could not form a swelling. In the treatment of inflamed bursæ upon the thoracic extremities, it is sufficient, as a general rule, to apply a sinapism six times a day, allowing it to remain a quarter of an hour each time; for the abdominal extremities more energy is required, and flying blisters should be used.

Two days after his entrance, upon examining this patient to see how his affection was progressing, M. Nélaton was struck by his febrile condition. He found the whole knee painful, and with the symptoms of what is called *arthrite sèche*, of an acute arthritis, without effusion. Leeches were applied about the joint, and the man was nearly well, when he complained of pain in the groin; upon examination, the ganglions there were found to be engorged. This, which was attributed to the irritation produced by the leech-bites, was supposed to be the cause of the pain in the groin; but the next day, the peculiar position of the patient struck M. Nélaton, and an effusion of liquid was found in the hip-joint. This was greatly benefited by a dozen cups, applied in the neighborhood of the great trochanter.

After remaining nearly a month in the wards, his articulations in about the same condition, but his general health becoming worse, the man complained of pain alongside of the sternum, at about the level of the third intercostal space. There was a projection there, as of an abscess with an acute march. Examining, in order to determine if it came from the interior of the chest, it was evident that the greater portion of the tumor was inclosed there. It was believed to be an abscess, formed in the cellular tissue of the mediastinum. Afterwards, there was some doubt as to whether the tumor might not be an encephaloid cancer; when the hand was placed upon it, it could be felt to beat; it was pulsating and fluctuating. M. Nélaton said that it reminded him exactly of the case of Bérard, junior.

The friends of this patient unfortunately removed him from the wards, so that no examination of the body could be made after death.

Behind the Elbow.

June, 1852. A young man, a performer on the violin, who, two months previously, had had a fall, in which the back part of the elbow struck the ground; it caused a slight excoriation just over the olecranon. He did not pay any attention to this, and by moving his arm backwards and forwards, it became irritated. In the course of two or three days, a tumor, painful to the touch, formed upon the olecranon, and in a short time opened itself. At the same time that this was going on, a great tumefaction of the forearm had taken place; it extended as far as the union of the superior third with the inferior two-thirds, where it seemed as if something had suddenly arrested it. All this had gone away. The patient entered on account of a small orifice just over the olecranon, which still continued to discharge a slight quantity of pus.

When the probe was introduced into this fistula, the bone was found to be denuded in a spot the size of a ten cent piece. This denudation of the olecranon, M. Nélaton said he had often seen in cases like the present, but he had never known any elimination of bone to be the consequence. After the bursa mucosa has been inflamed, the periosteum is affected, and the inflammatory action is limited to that. This denudation would be seen, little by little, to disappear; it would be covered by granulations, and a cicatrization would take place; the cicatrix would be adherent, but it would not be troublesome.

The treatment of the case was as simple as possible; it consisted merely in protecting the part from being rubbed.

This patient did not desire to await his cure at the hospital, and left in a few days.

The following case is not one of affection of the bursæ mucosæ, but being the result of a fall upon the elbow, is introduced in this place.

March, 1854. A man, sixty-one years of age, who, twenty-eight days before, had fallen upon the right elbow. This was all that the patient was able to tell about himself.

Immediately over the projection formed by the olecranon, was a tumor, as large as half an egg, and fixed in its position. The skin covering it was intact. By the touch, some things were felt that could lead the surgeon into error. In the course of a line drawn transversely across the base of the olecranon, a hard, angular border was felt, crepitation could be detected in the part, and, moreover, *the local pain* existed (the severe local pain observed in fracture, is meant). There was, nevertheless, no fracture in the case; by seizing the olecranon in one hand, and the ulna in the other, no abnormal mobility was found to exist.

The signs, which would appear to indicate fracture in this case, were to be explained in this way. At the olecranon, as in the bones of the cranium, in the sternum, &c., a contusion separates the periosteum, blood is effused underneath, and, at the edge of this, the blood is infiltrated; the central part becomes soft, while at the edge it remains hard. This hard border gives the sensation of a fractured edge. The crepitation comes from the breaking up of the coagulated blood by the pressure of the fingers. As a proof of the truth of this, when a sustained pressure was exercised upon the projecting edge, this was very painful at first, but the patient soon tolerated it—the blood *infiltrated*, coagulated, was then forced from under the finger, the edge disappeared, and the bone was reached.

This old man remained but a short time in the wards; he was unwilling to submit to any treatment.

At the Inferior Angle of the Scapula.

March, 1854. A man, who had a sore, situated near the inferior angle of the right scapula. His story was, that a tumor had developed itself there, and continued to increase in size until it became as large as his fist; he did not know when it had commenced to form. He let it alone until about fourteen months before his entrance, when it became very painful, probably on account of becoming inflamed. He then went to a surgeon, who extirpated it. At the operation, about a wineglassful of pus was taken away, and a fleshy tumor; a tumor formed, he said, of firm and black flesh. After this, he expected a cure, but the part did not heal. He therefore went to Beaujon Hospital, in the wards of M. Robert; there, iodine injections were made use of, and, at the expiration of four weeks, he went out well, or nearly so. The part became worse again, however, and he had been a second time to the hospital; the iodine injections had been again used, with the same effect, but, after leaving the wards, the part had again become worse.

At first, upon hearing this history, M. Nélaton was inclined to believe that the tumor developed near the angle of the scapula must have been a melanotic tumor, for the patient said it was so very black. But, melanotic tumors are very rarely single, and, again, they always return after their extirpation. Moreover, the patient said that a wineglassful of pus had come away at the operation, and melanotic tumors are not thus accompanied. It could not have been a lipoma, for, arrived at suppuration, it would have been very soft, and this tumor was firm and hard.

M. Nélaton believed the affection to be of the bursa mucosa, occupying the angle of the scapula, placed there between the bone and the serratus magnus muscle. The walls of an inflamed bursa can become thickened by a deposit of tissue, just as those of an aneurismal sac in the way of cure. The affection had been complicated by an effusion of blood into the cavity of the bursa. M. Nélaton said he could not be sure that this was what had occurred, but it seemed to him to be at least very probable. It was possible that the affection was a cold abscess, developed in that situation.

The actual condition of the patient, when he came into the hospital, was this: over the angle of the scapula was a fistulous orifice, and when a probe was introduced into it, it could be moved about, chiefly downwards, however, to the distance of nearly two inches.

In the treatment of this case, as injections of iodine had been already tried on two different occasions, and for a long time, the suppurating cavity should be largely opened; and the proper dressings applied until it had cicatrized. At the same time, search should be made to see if any necrosed bone could be found.

The opening was made very free; no necrosed bone was met with, the parts soon healed, and the man left well.

CHAPTER V.

ABSCESSES.

UNDER this head are placed those cases in which pus was collected in an adventitious cavity, the formation of which was owing to the production of this liquid in the midst of the tissues, and that were interesting as such, particularly as to their diagnosis and treatment. For the same reason—that is, on account of the diagnosis—those occurring in the same region are placed together, without regard to their etiology. *Phlegmonous* abscesses, or those succeeding an acute inflammation, and *cold* abscesses, or those succeeding a chronic inflammation, or appearing without any very manifest preceding inflammatory action, are therefore here collected together under the same heading.

Those cases, in which collections of pus were formed in the parenchymatous organs, and in certain natural cavities, as, for instance, the bursæ mucosæ, the articular synovial membranes, and the maxillary sinus, will be found elsewhere.

Cases of that variety of cold abscess, usually designated *abscess by congestion*, or *congestive abscess*, will be described among the affections of the vertebral column, to which they ordinarily succeed. The other symptomatic abscesses, urinous, stercoraceous, etc., will likewise be described along with the other affections of the urethra and the rectum, of which they are only a symptom.

The pus, in abscesses, is not in immediate contact with the tissues themselves, for it would then be a purulent *infiltration;* it is separated from them by a soft layer, of new formation, irregularly villous internally, and, externally, confounded with the neighboring tissues. It is composed of granular amorphous matter, of some fibro-plastic elements, and sometimes of fibres of cellular tissue. Many authors have called this layer, *mucous membrane of recent formation*, but, in its structure, it has none of the characters of the mucous membranes. Purulent cysts differ from abscesses, in the fact that the membrane inclosing the pus is thicker and more permanent.

Abscesses in the Neck.

July, 1852. A young woman, who had a tumor in the superior and lateral part of the neck. It was as large as the fist, and situated more deeply than just beneath the skin, being covered by the sterno-cleido-mastoid muscle. There could be no doubt that it was a liquid, and not a solid tumor, for it was everywhere fluctuating.

At first, M. Nélaton said, he thought this to be a ganglionary engorgement, with a collection of pus. In such cases, however, there are always some hard portions, and here the softness was everywhere the same, and the walls were soft, supple, and thin, throughout the whole extent of the mass. These characters are those of a cold abscess.

It remained to see if this cold abscess was idiopathic, an entirely local affection, or symptomatic of an affection of the vertebral column. The movements of flexion and of rotation of the head were so well executed, that it was necessary to exclude at once all idea of an affection situated in either of the first two vertebræ. All the other movements of the other vertebræ of the neck were perfectly easy, and, moreover, the tumor would have been placed much further down in the neck, had one of them been diseased. Again, the pharynx is situated directly before the vertebral column, extending from the basilar process of the occipital bone, as far as the fourth or fifth cervical vertebra. One of the first symptoms of disease in the upper cervical vertebræ, is difficult deglutition, for the cellular tissue between them and the pharynx losing its flexibility, the movement of slipping is impeded. In this case there was nothing of the kind. M. Nélaton said he was perfectly authorized to believe, that there was no affection of the vertebræ; and that the abscess was only a local affection. The puncture of the tumor, and injections of iodine, were sufficient to cure this patient.

June, 1852. A man, about thirty years of age, entered the wards for an affection apparently very simple, but the cure of which would prove to be very difficult. There was an abscess in the anterior part of the neck, projecting forwards where the thyro-hyoidean membrane is situated, and extending laterally; its progress was prevented by the insertion of that membrane upon the edges of the cartilage, and of the bone. This abscess had shown itself first, about two months before; it had already been opened, but the opening had closed, and there was a new formation of pus.

An opening was made into this collection of pus, and a probe afterwards introduced. The instrument penetrated for more than an inch, and then came in contact with something rough, like denuded cartilage. When a finger was then placed upon each side of the thyroid cartilage, and a slight pressure exerted, a cracking could be felt.

When quarrels occur in Paris, they have a practice of introducing the hand into the cravat, and of twisting it, so as to exert a great pressure upon the neck. M. Nélaton has seen fractures of the cartilages of the larynx, and of the hyoid bone, caused in this way. The patient was therefore asked if anything of the kind had ever happened to him, and he recollected that about two years before he had been thus treated in a quarrel, and he had had pains about the larynx for several weeks afterwards. Before the opening of the abscess, he said that he had had angina, by which he meant difficulty in respiration. Behind the thyroid membrane, near the base of the epiglottis, there is a space filled by cellular tissue. Of course, if an abscess should form there, whether it be idiopathic or whether it be symptomatic of an affection of the neighboring organs, by this pressure upon the epiglottis, a difficulty in the accomplishment of the respiratory phenomena would be produced. M. Nélaton believed that the violence inflicted upon the neck, in this case, had produced a fracture of the thyroid cartilage, which, it should be remarked, is often *incomplete.*

This abscess had first made its appearance, as was said before, about two months before the patient's entrance to the hospital; consequently, about twenty months after the injury to the cartilage. It is a remarkable fact, this tendency of fractures of the cartilages to give rise to local inflammations, and after a long time has elapsed, some months, or a year, or even more. M. Nélaton has often observed them to occur in this way, after fracture of the cartilages of the ribs.

In the treatment of this case, iodine injections should be made use of, and if it were found necessary, after a time, the cavity should be widely opened.

Injections of the pure tincture of iodine were made use of every day, for a length of time. The patient appeared to be benefited by them, but he left the hospital before any very evident change had taken place.

December, 1853. A young woman, twenty-seven years of age, a child's nurse, in whom a phlegmonous abscess had spontaneously developed itself in the sub-hyoidean region. A tumefaction there was very apparent, red, oedematous, and yet firm to the touch; the firmness was that peculiar kind of firmness, that resistance to pressure, possessed by certain inflammations of the cellular tissue. This tumefaction extended from the hyoid bone all down the neck as far as the insertions of the sterno-cleido-mastoid muscle. If it had been situated in the subcutaneous cellular tissue, it would not have been thus limited; and besides, the patient had difficulty of respiration.

It was evident, at once, that it was necessary to open this phlegmon. Chloroform was administered to put the patient under its influence, and the tissues were divided, layer by layer, to the extent of about one inch, in the median line, in the place where the operation of tracheotomy is usually performed. Quite a large quantity of pus came out of the opening, and the patient was notably relieved thereby.

M. Nélaton said it might be supposed that this patient would soon be cured, but it would not be so: she would be forced to remain a long time in the hospital, to say the least. His reason for saying so was that, upon opening the incision and examining the bottom of the wound, it was seen to pass between the muscles, into the cellular tissue in contact with the trachea. With a probe the peculiar resistance of the cartilaginous rings could be felt, and, in fact, the rings could be seen. Moreover, the probe showed that the cavity formed by the abscess was very extensive. Now it would be very difficult for these walls to unite, on account of the mobility of the trachea, and the peculiar vitality of the parts situated posteriorly; for if fleshy granulations are easily developed on cellular tissue or on bone, it is not so for fibrocartilage; they have never been seen to form upon it. It was to be feared, therefore, that the patient would preserve the fistula for a long time.

Abscesses formed in this situation must be opened early and freely, and in the direction of the greatest *décollement*, or separation of parts; for it is to be feared that the pus will proceed downwards further and further, even into the mediastinum. The danger of this is at once seen, by reflecting upon the anatomy of the region. The only means of preventing this is to make such an incision.

In making the incision, the tissues should be divided layer by layer, as in the operation for tracheotomy. M. Nélaton related a case to show that the subclavian vein might be opened in these operations, or in operations in this neighborhood. He was sent for once to visit a woman living upon the island of St. Louis (a part of Paris, about one and a half mile from his residence). She was a corpse when he arrived. The history of the case was, that the patient had had a small tumor in the neck, which her physician had persuaded her to have removed; and, in performing the operation, a hemorrhage occurred that could not be arrested. In making an examination of the body, a hole was found in the subclavian vein, into which M. Nélaton passed his fore-finger. The tumor itself was an appendix of the thyroid gland. It is said, moreover, that the brachio-cephalic arterial trunk was once opened by a young student, who was hastening to open the trachea of a friend who was drowned, in order to make artificial respiration.

The fistulous orifice in the place where the opening had been made into the abscess, was still discharging a small quantity of pus, when the patient left the wards, three weeks after the operation.

July, 1853. A young woman, with a notable inclination of the head towards the right shoulder. In a case of torticollis, that had been in the wards a short time before, a difficulty in swallowing made M. Nélaton believe that it was owing to an affection and a deviation of the first cervical vertebræ; in this case there was no difficulty in deglutition, and he judged, therefore, that the vertebræ were intact.

About five months before, near the angle of the lower jaw, and at the upper part of the sterno-cleido-mastoid muscle, a tumor that attained the size of a hen's egg made its appearance. After remaining two months stationary, symptoms of inflammation showed themselves, and several openings took place; the fistulæ still remained.

These fistulous orifices were numerous, and the parts occupied by them extended over two-thirds of the length of the mastoid muscle; the integuments there were loosened and very much thinned; in many places the probe could be seen under them. This subcutaneous *décollement* was more extensive.

In this case, an abscess had formed itself, and inflammation had succeeded; the patient had not submitted herself to any treatment; she had held her head inclined towards the shoulder, and the inflammatory action, the plastic lymph effused, &c., had produced a retraction of the muscles.

In the treatment of this case, the cure of the fistula was first to be obtained. The flaps had reached such a state of thinness that it would be impossible for them to form adhesions; they would therefore be cut away. After their excision, the condition of things would be that which exists after a burn of the fourth degree, and the cicatrization of the parts would tend to incline the head still more. Great care would therefore be necessary, and most probably some apparatus would have to be worn.

When the patient left the fistulæ were improved; the inclination of the head was no better.

Under the head of "Ganglionary Tumors of the Neck," will be found some other cases of abscess of this region.

Abscesses of the Thorax.

December, 1851. A young man, stout in appearance, with a tumor situated in front of the thorax. It was four inches in diameter; its superior edge being at a line drawn transversely between the nipples. One portion of this tumor was subcutaneous, and another was submuscular, being situated under the great pectoral muscle. The tumor was everywhere fluctuating. In the exploration of tumors by the touch, the surgeon should never fail to explore them in every direction, and also at more than one sitting.

The question in this case was, whether the abscess was idiopathic, or from an alteration in the bone. Pain, preceding the appearance of the abscess, is a good sign when it exists; but if it does not, nothing can be decided from its absence. In this case, the patient had had pain, for two months before the abscess showed itself, and M. Nélaton, therefore, believed it to be complicated with an alteration of the bone.

The abscess was opened, but no denuded bone could be found; it does not, however, by any means follow from not finding any that none exists, in these cases. Injections of iodine were made use of in order to modify the state of the parts, and to dispose them to cicatrize. The patient left at the expiration of a few weeks, with a fistula, discharging a small quantity of pus, in the place where the bistoury had been introduced.

February, 1853. A young woman, thirty years of age, quite feeble in appearance; she had never enjoyed very good health, and for the last two years had suffered very much from pains in the lumbar region. Fifteen months before her entrance to the wards, she had noticed a small tumor developing itself in the second intercostal space.

Just below the anterior extremity of the second rib, there was a rounded projection, about an inch in diameter, fluctuating, and quite tender to the touch. Corresponding to the third intercostal space, and somewhat further from the sternum, was a second tumor. This one at first seemed to be extremely movable, but by care in making the examination, the mobility could be seen to be only apparent. Moreover, it could be seen that there was a hard base to it, which remained adherent to the chest; this hard portion was very tender, the soft was not at all so. The liquid contained in one tumor did not seem to pass into the other.

It was necessary to know if the tumor went deeply into the chest. There was no dulness upon percussion in any part except just below the tumors, and there it could most reasonably be attributed to the situation of the heart. It could be said, therefore, that the affection was not intra-thoracic.

These tumors, M. Nélaton said, were evidently cold abscess; and the difficulty, almost insurmountable, was to tell their cause. Even after opening them, he would be unable to say if they had had their origin in an alteration of the sternum, or of a rib, which takes place sometimes, the pus at first forming where the necrosis is, but afterwards following the canal made for it beforehand, the fibrous layer of the intercostal muscles; or, besides, they might be caused by an affection of the costal cartilages.

However, whether owing to altered bone or not, it was thought best to empty these abscesses, and make use of iodine injections. No altered bone or cartilage was found in connection with their cavities. The woman went out, with the two fistulous orifices still unhealed.

January, 1854. A man, thirty-three years of age, stout and vigorous; he was a *corvoyeur* (a man employed on forced labor,) and perhaps his profession had something to do with his affection; for they often aid themselves in moving heavy objects, by pressing the breast against them.

In March, 1853, for the first time, he felt pain at the anterior part of the breast; its exact seat he was unable to localize precisely. By degrees, a swelling was developed there, at the fourth rib, in the neighborhood of the attachment of the great pectoral muscle of the right side. He entered the hospital of La Charité, where this swelling was determined to be caused by an abscess. It was opened about an inch from the sternum, near the fourth rib, and another incision was made, three inches distant from the first, at the same level, on the opposite side. A seton was passed from one to the other, and left there for six or seven weeks, when he left the hospital; he was better, but the suppuration still continued. The patient had commenced again to work, but had been obliged to leave off; and he entered the wards with a return of his affection.

The first thing striking the attention, was a deformity of the sternum; there was an anterior projection of the bone. From this, however, the volume of the tumor was not to be decided; for in many persons the sternum projects forward in this manner. This projection ascended as far as the union of the first and second pieces of the sternum, and continued down to the xiphoid cartilage; it extended laterally, being lost in the neighboring parts, so that it was impossible to say where it ended. The openings made by the old incisions could be seen, and, by pressure, pus could be made to issue from them.

When a probe was introduced into the opening to the right of the sternum, for the purpose of exploring the part, it was arrested, after penetrating directly perpendicularly one and a quarter inch; in other directions it could be passed much further; *in front* of the sternum, and not behind, as it might have been supposed it would go, it entered rather more than three inches.

In some places the tumefaction was soft; in others hard; and this hardness was so great that it might have been believed to be new bony formations upon the sternum; the softness was such, as to be evidently owing to a liquid. This softness was particularly evident in two places, and the two abscesses, thus manifested, had no communication with each other. There was nothing shown by percussion to indicate any purulent collection in the thorax, behind the sternum.

As an affection of the kind, existing in this instance, might be supposed to be caused by scrofula, several questions were put to the man, in order to learn something about it. He was rather subject to taking cold. Three years before, he had spit blood, but he could give no details, so that it could not be known whether it had proceeded from the lungs or not; no symptoms of any pulmonary affection could then be detected. He had become thinner, it was true, but the affection for which he had entered was quite sufficient to account for this; and, besides, his health was quite good.

All these particulars were entered into, because an important question was to be decided, namely: Would it be proper to perform an operation for the relief of this patient? The affection was serious, a caries of the sternum, with denudation of the bone, suppuration, and no tendency to cicatrization. The suppuration was quite abundant. The man was forced to work in order to live, so that, unless something were done to cure him, he must pass his existence in a hospital. The two abscesses then existing would be opened, and the bone could then be well examined, and he extent of the disease decided; perhaps the necrosed portion would be found ready to be eliminated. If a large extent of the sternum were affected, what was to be done? should a part of the sternum be excised? This is an operation of high antiquity; Boyer performed it once, but the surgeons of the present day no longer practise it. In fact, in all the resections of the sternum or of the ribs, that he had witnessed, M. Nélaton said he had always seen the patients die. They were worn out by the suppuration, or perished from putrid infection; for the parts are most unfavorably placed for cicatrization. But, in this instance, it really seemed as if such an operation ought to be performed: for the patient was young, and, without such relief, his condition would be excessively miserable.

Both the abscesses were opened, but no denuded bone could be found, though the finger was introduced in every direction. The next day, a most careful examination, with a probe, was made with the same result. M. Nélaton, however, said that the not finding any was no decided proof that none existed. The patient continued in the wards, under observation, for about a week, and then left, in about the same condition as when he entered.

February, 1854. An old soldier, whose health was quite robust. Three weeks before, he had felt a sharp pain, at a short distance to the right of the sternum: and, examining the place, he found there a small tumor. At the same time, he had some trouble in his digestion: for which leeches had been applied over the region of the stomach.

This tumor was situated just below the sixth rib: its greatest diameter measured three inches, the smallest, one and a half. It was everywhere fluctuating.

The question was: what was the origin of this tumor? Did it come from an alteration of the ribs, or from a change in the cartilages? Was it an appendix of an internal tumor, situated in the pleura, or in the anterior mediastinum, as, it is well known, happens in some cases? Auscultation and percussion showed, very evidently, that there was no tumor in the pleural cavity. In regard to the mediastinum, it was more difficult to speak; but, founding his opinion on the rarity of such abscesses, and again on their situation when they do occur, M. Nélaton said the tumor could not proceed from there. Owing to the anatomy of the region, there are certain favorite places (*sièges d' élection*) for the external appearance of abscesses of the mediastinum. The cellular tissue of the mediastinum extends down alongside of the xyphoid cartilage, and there, between the sternum and the cartilages of the ribs, the abscess shows itself. When they are situated high up, they come out between the upper ribs, the second and the third, for instance; in the region where the tumor was placed in this patient, the cartilages are too closely together.

In the neighborhood of the tumor, there were none of the phenomena of local inflammation. The anterior face of the sternum itself was not exactly normal; it seemed to be somewhat raised, just at the tumor; nevertheless, M. Nélaton would only say *seemed*, because it is often very difficult to speak positively in cases like this; he has, many times, seen a hard border about a tumefaction simulating an osseous alteration.

Was there an alteration of the ribs? M. Nélaton related two cases in which he had been deceived; he could find no sign of osseous disease, and when the abscesses he had considered to be idiopathic were opened, he found them to be sympathetic of an affection of the bones of the ribs. He has himself seen Gerdy and Roux make the mistake, and could cite many more instances; but when surgeons of such eminence as these can be deceived, it is unnecessary to mention others. Here, he said, he believed in the existence of an idiopathic abscess. At any rate, there could be no harm in acting upon this, the most favorable belief, and in opening and injecting the abscess.

Before operating, M. Nélaton waited for several days, in order to examine the case with the greatest care. After the injection of the iodine, the sac, in which the suppuration had been contained, became swollen again by subsequent effusion, but this was gradually absorbed, and the man went out well.

May, 1854. A young man, twenty-three years of age, a turner in copper. In working, turners sometimes press the instrument against the breast; those working in copper, however, not so much as some others. Eight months before, he had a pain in his side, as the seat of which he showed the right mammary region, but without indicating any fixed point; at the same time, he had great oppression in breathing. He was forced to continue to work, struggling, as well as he could, against the suffering. Sinapisms were applied over the part, and afterward an irritating ointment, probably of tartar emetic, for red spots could still be seen. Six weeks before entering the hospital, a tumor commenced to show itself. It was very important to know where it showed itself first; whether in front of the sternum, or at the side; for if at the side, it might have come from deeply seated parts. This patient, it may be remarked, was very exact in his relation. He said the swelling had first appeared at the side, and that the presternal region was afterward invaded.

This patient was very subject to colds in the head; he had never spit blood. There were no other marks of scrofula about him. The swelling projected but slightly above the level of the skin; it was impossible to determine its limits with precision; there was a slight projection, of a certain extent, but not limited as an encysted tumor would be. There was, however, a summit very slightly pointed, situated between the fourth and fifth intercostal spaces, rather upon the right than the left side. It is very important for the surgeon to be aware of the fact, that the space between the sixth and seventh costal cartilages is very narrow, while, on the contrary, between the fifth and sixth, there is a separation. It is very important to know this in case he be asked to puncture the pericardium. The color of this swelling was reddish, as of a purulent collection tending to open itself; moreover, it was fluctuating, and painful upon pressure.

This pus could come from several sources. There had been oppression of the respiration, which had ceased when the swelling made its appearance. This would give the idea of a pleuritic attack, of an effusion in the thorax, surrounded by false membranes, which had afterward made its way out. At the time of the difficulty of breathing, however, the patient had had no symptoms of fever; he had continued to work, and, moreover, auscultation and percussion showed no difference between the two sides of the chest. It could not, therefore, have been pleurisy. As another source, the vertebral column was thought of. It is well to know, that some abscesses begin in that part, and, following the ribs, show themselves on the walls of the chest, where the external intercostal muscles cease. The pus follows the course of the vessels between the intercostal muscles. This has been shown repeatedly by pathological anatomy. The pain of which the patient complained, might have been the pain *à demi-ceinture*, the pain extending half around the body, so common in affections of the vertebral column. The tumor was possibly, then, an abscess, symptomatic of an affection of the vertebral column, a migratory abscess, as it is called.

Again, it might be a migratory abscess, with an affection of the ribs. And, lastly, it might be owing to an affection of the sternum. The surgeon must not think that he can always find the portion of bone diseased. If it is true that its disease is generally accompanied with pain, yet it is not always so. In doubtful cases, it is necessary to draw inferences from everything; everything should be taken into account. In this case, there was a projection, which is very usually remarked in old persons, developed where the second and third bones of the sternum meet together. It is just as in the spinal column, where, in old age, the vertebræ approach each other, overlapping the cartilage. In an old man, this would not be thought much of, but here it was of some importance. It might be said, therefore, that there was an affection of the bones of the sternum, and of its posterior portion, for the disease seemed to have originated in the thorax, and the patient was relieved when the tumor came out.

At all events, it would be proper to open the abscess, and, having evacuated the pus, to inject iodine. If left as it was, the pus would produce a *décollement* of the tissues in the whole neighborhood. As to the result, an immediate closure might be produced; but if, as was probable, an alteration of bone existed, the formation of pus would persist. A fistula, however, is of much less importance than a vast abscess. No denuded bone could be found at the examinations made after the opening of this abscess. The patient was still in the wards when I left Paris.

Abscess in the Hand.

November, 1853. A young woman, with a curious affection; there was a small bunch of red granulations, resembling a mushroom, in the palm of the hand. She had had an abscess there, into which a small incision had been made, and the pus evacuated.

This affection is often seen in the hand. Suppuration takes place under the derm, and it is perforated; the epidermis, which is very thick, is opened with an instrument, the pus flows out, and all the indications are supposed to be satisfied. It is not so, however. The pus has formed beneath the derm, and has pierced a small hole through it. On account of the *décollement* under the derm, the aperture does not cicatrize. The granulations which form, push their way through the opening, and are there strangulated; and the same thing happens to them at the epidermis.

This is what had taken place in this case, and thus the formation of the projecting mushroom was to be explained.

These granulations should not be cut off, for they are very vascular, and bleed a great deal; it is better to destroy them with caustic.

Abscesses of the Forearm.

April, 1852. A young boy, who had had an abscess of the anterior portion of the forearm. An incision had been made into it, and the parts had all healed. His fingers, however, were in a state of permanent flexion; it was impossible for him to extend them. His object in coming to the hospital, was to have them put into their proper position.

This operation of straightening the fingers is exceedingly painful, and therefore chloroform should be used. Nothing is more easy of execution; there are, however, one or two points worthy of notice. One finger should always be pushed back at a time. This is necessary in order to detach the tendons from each other.

December, 1853. A little Savoyard, a chimney-sweep, with an abscess upon the front of the arm, near the wrist, extending from one side to the other. This collection of pus was developed in the layer of cellular tissue underneath the skin, exterior to the aponeurosis, as was shown by its projecting; otherwise, they tend to extend, being bound down by the fibrous envelop.

The skin was thin, and the absorption of the liquid was not to be attempted. An incision was therefore made, and the pus evacuated.

The boy got well promptly.

January, 1854. A young man, who, a month before, in working with a heavy instrument to clear away snow, had rubbed his hand a good deal. An inflammation of the hand followed, an abscess formed, and it had been opened. This had healed, but the inflammation, however, had not ceased; the inner part of the arm had become invaded.

There was considerable tumefaction of the upper and inner portion of the forearm, red, and with augmentation of density; it was œdematous, and a plastic exudation was easily recognized to have taken place.

Evidently, in this case, the surgeon had to deal with *diffused phlegmon*, which has so great a tendency to produce mortification of the cellular tissue.

The question was, whether it was proper to make incisions into the part. It was decided not to do so, until it was seen whether the disease was progressing or diminishing; for there was some reason for supposing the latter, from what the patient said. Mercurial ointment was applied upon the arm, and the parts got well by resolution.

March, 1854. A young man, who had entered the hospital, on account of a whitlow on the little finger.

All seemed doing very well; the finger seemed all right; as to the hand, it was impossible to say, for the skin was too thick; but upon the forearm, small rosy spots were found disseminated. There was no very great pain there; yet, when the arm was pressed, the patient complained. Fluctuation was very manifest. Here, more than in any other part of the body, it is necessary to make palpation in the direction of the long diameter of the limb; transversely, any forearm, slightly swelled, will give a sensation of fluctuation. There was, in this case, without doubt, a collection of liquid, and a very considerable one; the skin was raised up for a distance of four or five inches, and the liquid was not only in the centre of the arm, but it extended to the sides; it occupied all the depth of the anterior face of the forearm. It was deeply seated; for, if superficial, the skin would have been more red, and the tendons of the muscles would not have been felt, as they were in this case. Very probably it was situated, here, between the two layers of muscles. It was necessary to know if it extended under the ligament at the wrist; there was no effect made upon the hand by pressure on the forearm, no sensation of any communication.

The case was one of phlegmonous abscess, dangerous from its vast extent, and, again, from its situation among the flexors of the arm; they might be deprived of the power of acting, by the formation of adhesions with each other, or by gangrene. It was necessary to open at once, and by means of a long incision.

In making this incision, the median nerve may be interested, or some vascular branches; and, again, if it be made through a muscle or a tendon, the pus flows badly through the *button-hole* opening. It should be practised in this way: through the skin an incision should be made three inches in length; then examining the aponeurosis, an interstice between two muscles will be found; a small opening, through which a director is passed, is then made: and thus the surgeon can cut without danger, and as far as he wishes.

This operation was performed with as much care as if it were designed to tie an artery. The muscular interstice chosen, was that between the radialis anticus and the palmaris longus; and through it the director was passed, in order to separate the parts. The whole superficial layer of muscle was passed through before any pus issued; after the director had sufficiently enlarged the opening, the finger was introduced. A great quantity of pus issued, which was mixed with blood, as is seen when an abscess has rapidly formed.

The next day, the opening had closed; the muscular bundles that had reunited were opened with the finger, and much dark-colored blood came away, that had already commenced to undergo decomposition. A piece of linen was introduced between the lips of the wound, to be taken out during the day, and the abscess thoroughly evacuated.

Much pus came out of the opening. The patient looked well, ate well, and slept well. On the fourth day after the incision into the abscess, something happened that caused M. Nélaton a great deal of anxiety. About ten o'clock in the morning, he had a violent chill, that lasted for two hours, and was followed by fever, and by perspiration. It was dreaded lest this might be the first symptom of a purulent infection.

When is a chill seen to take place in a surgical patient? When they are attacked with erysipelas; sometimes before, sometimes at the same time, and sometimes after the redness and the swelling appear: here, there were none as yet; and it was impossible to say whether the patient would be so fortunate as to have such an attack. There were no signs of angeioleucitis, which is often thus preceded. At times, pneumonia and pleurisy are preceded by chills; here, however, there were no signs of any affection of the interior of the thorax. When a patient is about to be attacked with purulent infection, they often, indeed most generally, have a painful point at some articulation; here, there was none; the patient said there were no small streaks of blood in his spittle, which are quite often seen before the formation of metastatic abscesses in the lungs; there was no jaundice, no appearance of affection of the liver. Nevertheless, M. Nélaton said, he should not be surprised if the patient should have more chills, and if all the phenomena of purulent absorption should follow. The tincture of aconite would be given, for it was the only medicament he had ever seen to do any good.

The patient did not have another chill; he had, however, a severe attack of diarrhœa. A few days after the chill, a small abscess had formed on the external side of the elbow, which healed after a simple puncture. The patient went out well, after a sojourn in the wards of about a month. There was some stiffness in the movements of the fingers, but that would gradually disappear in the course of time.

While the patient whose case has just been related, was still in the wards, a boy was brought in, whose hand had been run over by a carriage. The wheel had passed from the cubital to the radial edge, where, in the palm, at the space separating the first and the second metacarpal bones, the hand had *burst*, so to speak. The neighboring parts became very hard and livid, for in these cases there is a considerable afflux of blood. A careful examination was made, to see if a fracture existed, but none could be found; there might, however, be one, for the circumstances were very unfavorable to its detection, the tension of the soft parts being very great; and, in the short bones, abnormal mobility cannot be much relied upon as a symptom of fracture.

A current of cold water was made to flow constantly over the part, and all went on very well, when the first symptoms of a complication, an abscess of the forearm, showed themselves. The forearm commenced to swell at the part immediately above the wrist: its form became more cylindrical, the color of the skin became reddish, and there was pain, spontaneous, and increased by pressure. At once, upon exploring the parts, it was seen that a collection of pus was threatened. It should always be remembered, in examining a limb for the presence of pus, to place the hands in the longitudinal axis of the limb: when placed transversely, the displacement of the muscles may deceive you. In surgery, the feeling of fluctuation is very important, and the hand *to be raised* must, of course, be raised with more ease, if there be much liquid pressed under it; hence, it should be *pushed* there with the other hand. What is called fluctuation, is not a sensation of a wave of liquid (*d'un flot*); it is a raising up (*un soulèvement*) that is felt: fluctuation is a bad word. Again, the hands must be placed sufficiently far apart, so that the movements of the integuments may not lead into error. Sometimes it happens, that this sensation of raising is felt when there is no purulent collection, in spite of the surgeon having put himself under the best conditions. It is in this way the skin is pressed upon, the subcutaneous cellular tissue slips, and the muscle is so pushed as to raise up the other hand; it is sufficient, however, to be aware of this, not to be deceived by it.

In this case, then, an abscess was to be dealt with, and one very deeply seated, for the tendons had been forced up, so as to be more projecting under the skin. Now, these abscesses have a great tendency to extend rapidly, so that, in a few days, the whole limb may become infiltrated; it is necessary, therefore, to open them without delay.

The difficulty of opening these collections has been already described; a simple puncture is *blind*, so to speak. The patient was put under the influence of chloroform, and a long incision was made in the forearm, as if one of the arteries was about to be tied; the aponeurosis was then opened upon the director, and the muscles beneath separated by the same instrument. After the opening had been made by the director, it was enlarged by the extremity of the fingers; which is the clearest and the surest way. Pus came out, not in very great quantity, for the opening had been made too early. When pressure was exercised upon the limb the following day, it came away more abundantly.

These abscesses, M. Nélaton remarked, develop themselves, as he had said before, upon occasions where the hand has been wounded; what wounds are they, which cause them? The two varieties were at that time together in the wards; one, from a wound of the little finger, the other, from a wound of the thumb. They very rarely form after wounds of the other three fingers; and the anatomy of the parts, which shows that the sheaths of the flexors of those fingers do not communicate with the sheath under the annular ligament under the wrist, explains the reason.

Both of these patients got well, and went out about the same time, at the end of April. In this latter case, the opening was made on the radial edge of the radialis anticus muscle, and everything went on better than in the other, where it had been made on the other side between it and the palmaris longus. M. Nélaton dissected an arm for the purpose of satisfying himself as to the most propitious place for the incision; and was disposed to think the one he had made last, to be the best, unless under some particular circumstances. For, between the radial flexor and the palmaris longus there is the median nerve; on the inner side of the palmaris longus, is a thin portion of the ulnar flexor, which passes under the palmaris; on the radial side of the radial flexor, there is nothing in the way.

March, 1854. A young girl, twenty years of age. When seventeen or eighteen years of age, and before she left the département des Vosges, her native country, a goitre formed upon her neck; frictions with iodine ointments were used, and it all disappeared, so that not a trace of it remained. She herself did not doubt but that she had been cured by these frictions; but, just at the time when she commenced to make use of them, she left her native place, and it has been observed that a number of persons, who have a recent goitre, are cured by the fact alone of change of residence. This affection had nothing to do with her entrance to the hospital, but the circumstance is worthy of notice. On the anterior face of the right forearm was a tumor, that had commenced five years before, situated at about the union of the upper third with the lower two-thirds of the pronator radii teres. It had made its appearance without pain or redness of the skin; the only thing noticed was a moderately hard swelling. It remained stationary for four years and ten months, and then, that is, about two months before coming to the wards, it became painful and enlarged, and the skin covering it was hot and red. Cataplasms and frictions were made use of, and it diminished again in size about two-fifths of an inch.

This tumor, the examination of which was attended with some difficulties, was two inches long, and one and a fifth broad; it was a body shaped like half an egg, the section made through the long axis, applied upon the anterior face of the forearm. By the touch, two parts could be felt, one hard, the other soft; the hard part was somewhat the larger; it was toward the internal side of the arm, and seemed to propagate itself at each extremity of the tumor by a small cord about one-third of an inch in length.

In regard to the situation of the tumor, it was evidently under the skin; and as the skin itself was very movable, it was under the subcutaneous cellular tissue also. When examined with reference to the muscles, the difficulties increased. The examination was conducted in this way: the muscles were rendered immovable, were made to contract forcibly, in succession, and the effect upon the mobility of the tumor was inspected. When the pronator teres was in a state of permanent contraction, it seemed to be more fixed—not immovable, it must be understood, but merely *more fixed.* The contractions of the palmaris longus, and of the other muscles, had no such effect upon it. There is an aponeurosis for the muscles of that region, and the origin of the tumor, its *point de départ*, was supposed to be in that aponeurosis. The contraction of the muscle influences this aponeurosis, and by its being in a state of tension, the tumor would lose some of its mobility. The two prolongations, however, at the extremities seemed to enter between the muscles.

In considering what might be the nature of this tumor, it should be recollected that the patient was a young woman, and that it had existed for five years. It was not a lipoma; it was too fixed and too firm for that. To place in review what it might be: it could be an encephaloid tumor; or, a cold abscess, with tuberculous matter about it; or, it could be a simple hydatid cyst.

The situation of the tumor was favorable to the idea of its being encephaloid, for the anterior face of the forearm, as the internal face of the thigh, is one of the favorite places (*sièges d'élection*) for its development. Yet, it would not do to stop there, for the tumor was of old standing, and the progress of encephaloid disease is rapid; and the local symptoms, the increased size of the veins, &c., were wanting. In an encephaloid tumor, some parts are hard, and others soft, here and there, and not, as in this case, one hard and one soft portion juxtaposed. Again, what had taken place a few months previous to the patient's entrance, showed that it could not be encephaloid, for, when such a tumor has once ceased to be indolent, it never stops; and, again, it never diminishes in size, except by the gangrene and sloughing of some of its parts.

M. Nélaton said he thought it to be a cold abscess. He had said it might be an hydatid cyst, because he had once seen a tumor in precisely the same situation, which M. Gerdy commenced to extirpate; as soon as an incision was made, an innumerable quantity of small hydatids, bathed in a liquid, flowed out. He said he would not be surprised to find this tumor to be one of a similar character: but, how could such a tumor diminish in size? It is not exceedingly rare, however, for hydatid tumors to remain for a long time stationary, and then suddenly to become inflamed, to suppurate, and then to open, giving exit to the small bodies. It was possible that, in such a case, if the patient was careful, and the proper treatment was used, that the inflammation would cease, and the tumor return to its original volume.

M. Nélaton said he would limit himself to making a simple incision into the most projecting portion of the swelling, and then exploring it: if it should prove to be encephaloid, he would extirpate it. To his great satisfaction, it proved to be a cold abscess, or an hydatid cyst that had suppurated. The sac was emptied, and the part soon healed.

Abscesses in the Axilla.

December, 1853. Three of the four varieties of abscess of the axilla were in the wards at the same time; and, by a singular chance, the fourth was seen at an autopsy, made in a case of cancer of the tongue, elsewhere reported.

One of the patients, a woman, had small, red, quite hard swellings, softened at the top, subcutaneous, placed where the hairs seem to be implanted. She presented five or six furunculous abscesses, an affection situated in the deep parts of the derm, and in the adjacent layers of tissue. Some incisions were made into the agglomerated small furuncles, and the patient went out at once, for there was a good deal of cholera in the wards.

The second case was that of a boy; there was a voluminous mass, quite well circumscribed, touching the pectoralis major in front, and the latissimus dorsi behind, and situated in the thoracic portion of the axilla; there were swelling, pain, heat, and redness. In a few days, a puncture was made, and, afterward, an incision. This boy was a grocer, and they often have sores on the hands; hence there was a probability of his having angeioleucitis, and an affection of the ganglions in the armpit. After the evacuation of the pus, such a disposition could be perceived; there were still large ganglions in the process of resolution.

This second variety of abscess in the axilla, is developed in the thoracic portion of the armpit, where the ganglions are most abundant. The first variety is developed in that portion where the hair is, as furuncles are.

This boy had a very severe attack of cholera; he was treated by drinks containing sulphuric ether, ice, Seltzer-water, and by the application of a very large blister over the epigastric region. He went out well.

In the third variety, there is no change of color in the skin; there is a general tumefaction, causing, in part, the disappearance of the pit, and extending beneath the latissimus dorsi, and also in front. There is no œdema of the skin, and no circumscription of the tumor; when the arm is moved forward, the hollow of the axilla disappears entirely, and then, where the pit was seen, there is a bulging. It is a vast purulent collection, and one wherein it is very difficult to find fluctuation, for the arm cannot be extended from the trunk of the body. These abscesses should be opened, and very largely, for they are very unfavorably placed to heal.

This is what is called deep-seated phlegmon of the armpit. They are seated in the excavation between the serratus magnus and the subscapularis; they descend below the scapula; and also propagate themselves upward, and escape above the serratus magnus.

This is the variety that, by a singular coincidence, was just at this time found at an autopsy, made in a case of cancer of the tongue. In this case, it extended far up under the trapezius. The abscess was sufficient to cause death without pneumonia. These abscesses have, for their characteristic, an extreme tendency to diffusion.

The fourth variety is only a diffused phlegmon in the subcutaneous cellular tissue. This patient was a woman, and she recovered rapidly, after several large incisions had been made. In these cases, when the surgeon suspects, not that there is pus, but that it is about to form, he must make these large incisions.

January, 1852. A man, with a tumor in the armpit of the right side. It had two lobes, both fluctuating, and the liquid contents could be made to pass from one into the other; the parts around were hardened.

The history of this case proved it to be one of ganglionary abscess. Two months before, the patient had had a wound upon one of his fingers; he had neglected it, it became very sore, and then this tumor in the armpit made its appearance.

This swelling would require to be opened, and *largely*, for ganglionic abscesses, and, above all, those situated in this region, give rise to most obstinate fistulæ, unless this be done.

Two large incisions were made, one in each lobe, and the abscesses speedily healed.

Abscess of the Shoulder.

July, 1853. A delicate little girl entered the wards, to be treated for an affection of the shoulder; its superior portion, posteriorly, presented a tumefaction, giving exaggerated volume to the part. In front, the head of the humerus, and all the osseous parts of the joint were felt, normally disposed; likewise, externally, there was absolutely nothing abnormal. Posteriorly, it was different; there, below the acromion and the spine of the scapula, was a tumor, which, in front, covered the small tuberosity of the humerus, and, below, caused a depression in the pit of the axilla.

The skin over it was intact, not adherent; this it was easy to understand, for the swelling was deeply seated.

This tumor was quite firm; so much so, that, at first, you were inclined to believe it to be formed by a tissue, and not by a liquid; in some places, it was quite hard, in others, it was softer. The softest point was near the centre, and precisely there it was least covered by muscle; it seemed as if, uncovered by muscle, it could have pushed further out. By very great care, fluctuation could be felt in every part.

This tumor had been five or six months in developing itself. It had never given rise to pain.

Was this affection one of white swelling of the joint? No; for you could move the humerus backward and forward, and rotate it, perfectly well; abduction was difficult, but that was owing to the engorgement of the parts in the axilla. Again, in white swelling of the shoulder-joint, there is always pain at the elbow; and a case without it would be a very great exception. No pain at the joint, and no pain, above all, at the *siège d'élection*, and no injury to the movements, forbade the supposition that the affection was in the articulation.

What, then, was the nature of this tumor? In the very first place, an abscess suggested itself; but the hardness of the tissues in the neighborhood was opposed to this supposition; notwithstanding that, however, M. Nélaton said, he did not hesitate to pronounce it a cold abscess. This hardness in the neighborhood, when he first saw it, made him suspend his judgment, but he no longer hesitated to say so; for such a condition might have been produced by an inflammation in the parts near it. We are accustomed to see cold abscesses everywhere soft; but a condition similar to what existed in this case, is not very exceptional. It was a cold abscess, of great extent, situated principally under the posterior portion of the deltoid muscle.

If the tumor was formed of a tissue, it could only be encephaloid; and in that case, the affection would be a most serious one. If, notwithstanding his opinion, it should prove to be so, must the child be left; was there nothing to be done for her? The records of surgery contain a number of cases of recovery, after loss of the arm and scapula. It did not appear to be unreasonable, therefore, to suppose that such an operation could be performed here; or, at least, that the portion of bone to which the tumor was attached could be removed. An incision could be made behind the shoulder; there, there would be no danger of injury to vessels or nerves, and the head of the humerus could be made to come out, and the resections practised. This is what he would do, M. Nélaton said, if, in spite of all probability, the affection should prove not to be an abscess. He would first make a puncture, in order to explore; if pus was found, the usual treatment by iodine injections would be made use of; if serum, the same—for the tumor might possibly prove to be a hydatid; if blood and encephaloid matter, the operation just mentioned would be at once proceeded with.

The affection proved to be one of tuberculous abscess, the contents of which were still hard in many places. It was evacuated, iodine injections were used, and it healed very readily.

Abscess on the Leg. (*Diffused Phlegmon.*)

December, 1851. A man, fifty-eight years of age, recently employed as a house-painter. He had the look of a person worn out by hard work.

He entered the hospital on Monday, in the evening; the Friday before, he had worked as usual, but found himself, however, to be unwell; in the evening, after going home, he was seized with a chill, which was followed by heat of skin, and by perspiration; he had felt so very warm after the chill, that he had opened his window. The next day, he had pains in the left leg, and they continued to increase until his entrance. On Tuesday morning, when M. Nélaton saw the patient for the first time, the leg was swollen, hard, and resisting to the touch; when, however, the pressure was persisted in, the liquid underneath was expelled. The color of the limb was a lively red, and it was painful to the touch, particularly about the middle of the leg. The affection was evidently a diffused phlegmon. The pulse was one hundred and fifteen, the skin hot, and the man was a little delirious. Five long incisions were made through the skin and the subcutaneous cellular tissue. The next day, the skin covering the leg was wrinkled; the patient had passed a good night, and his pulse was less hard and less frequent.

As the cause of this affection, upon examining the limb, upon the big toe traces of excoriations were found; they are very common in laboring men. These excoriations, irritated by their heavy shoes, very often of wood, become inflamed; the inflammation attacks the lymphatic vessels, and is propagated with the greatest rapidity; the cellular tissue is affected; and you have a diffused phlegmon.

Diffused phlegmon, and *very extended* phlegmon, are often confounded; but they are not the same thing. The fundamental character of diffused phlegmon, that which distinguishes it from the other, is its tendency to produce mortification of the cellular tissue. When he had opened a diffused phlegmon early, M. Nélaton said he had never found the pus infiltrated in the cellular tissue; there is serosity in the cellular tissue, and it is gorged with blood. The next day, in the bottom of the incisions, the mortified cellular tissue is seen, of a grayish white color, still adherent to the neighboring parts; there is still no infiltrated pus. It is only at the period of elimination of these eschars, that the pus commences to make its appearance. Thus, in M. Nélaton's opinion, diffused phlegmon is a gangrenous and diffused inflammation of the cellular tissue; the suppuration is only the consequence, so to speak, of the formation of the eschars. It is, therefore, very important to diagnose the affection; for, if you wait to make the opening, until you suppose the parts have become gangrenous from pressure, the whole limb will be infiltrated with pus; the eschars have formed, and an opening should be made for them.

In the treatment of the affection, the position of the part is of great importance; it should always be elevated. Uniform compression is good, and when it does succeed, it succeeds admirably; it demands, however, a good deal of experience in the management of bandages. It can only be relied upon, when the disease is at its commencement. M. Velpeau, nevertheless, advises this practice when the cellular tissue already contains some pus, with the design of limiting the inflammation to the points where suppuration is already established, and in order to place a limit to the extension of the phlegmon. Mercurial ointment has also been recommended, but the appearance of the part is concealed by it; and, as a general rule, it does not lead to a resolution of the inflammation. The method of Dobson consists in practising, by means of a lancet, a great number of small punctures, which penetrate into the subcutaneous cellular tissue. It is objectionable, however, because it is very painful, and it is necessary afterwards to make larger incisions, in order to remove the sloughs.

The best mode of treatment is that by long and deep incisions, distributed methodically and at equal distances. When the phlegmon is subcutaneous, they should divide the skin and the subjacent layer of cellular tissue; if the phlegmon is deep, the aponeurosis enveloping the muscles should also be divided. Both before and after suppuration has commenced, these incisions are useful; for, in the first case, the formation of sloughs and suppuration are inevitable; in the second, it is proper to give an immediate issue to the pus, which would be infiltrated, and cause an increase in that separation of the parts, which is constantly observed in these cases.

It is well to know, that in making these incisions a gush of blood may take place, and in this case it did. It is owing to the fact that the tissues become hardened and thickened, so that the bloodvessels cannot retract. In this case, pinching the vessel with a pair of forceps was sufficient to stop the hemorrhage; in case that should not suffice, some charpie, and compression could be made use of.

The suppuration in this patient became very profuse, but the elimination of the sloughs progressed slowly; livid spots, showing that mortification had taken place, appeared upon the leg, and the soft parts covering the sacrum commenced to mortify; the death of the patient was inevitable, M. Nélaton said. Two weeks after his entrance, this patient died. At the autopsy, the skin covering the leg was found almost completely separated; almost the whole of the subcutaneous cellular tissue had mortified; it was easy to see that the disease was limited there, and that beneath the aponeurosis, everything was intact. There was pus only where there were sloughs; there was no infiltration of pus. In the femoral artery there were no traces of arteritis; there was one place, where there was ossification from the age of the patient, and then, because the walls of the vessel could not come together, owing to the inability of the vessel to empty itself, there was a coagulum. In the veins of the limbs, there were no traces of phlebitis. In the whole body there was no complication to account for the death of the patient. He died, M. Nélaton said, simply from exhaustion, *par épuissement de ses forces.*

Abscesses on the Thigh.

February, 1853. A man, whose case was very simple, but in which there was a peculiarity rendering it worthy of attention.

Upon the right thigh there was a tumor, or rather a projection, four inches long in its greatest diameter, which was in the direction of the axis of the limb; it commenced three inches from Poupart's ligament, and was placed directly upon the course of the femoral vessels. There was no alteration of the skin, but, here and there, there were reddish spots, and the epidermis was desquamating; underneath, there was fluctuation in every direction.

An abscess situated in this part of the thigh is very rare, unless there be some special cause for it, and, therefore, M. Nélaton thought at once that it had been preceded by angeioleucitis. He asked if there had been any excoriation upon the foot; the patient said not, but he does not rely much upon what his patients say; he accepts their testimony provided he finds it to be true, or, as he expressed himself in a law phrase, *sous bénéfice d'inventaire* (without liability to debts beyond assets descended). Upon searching, a wound of the heel was found, caused by the shoe. There had been an angeioleucitis consecutive to this wound, and an abscess had formed.

It was necessary to open this collection of pus, but it was badly placed for making an incision; the centre of it corresponding to the course of the femoral vessels. Some very distinguished surgeons, in opening abscesses similarly situated, have committed the fault of opening the vessels which had been displaced by the purulent collection. M. Roux, with his usual frankness, relates a case in which he opened the femoral artery. The displacement is at times enormous; the vessels may be three or four inches from their usual situation.

This abscess being a large one, it was evident that it must have caused a great separation of parts, and, particularly, towards the internal portion, where the pus would have rested. Towards the antero-external part of the collection, a small incision was made;

only a portion of the liquid was allowed to escape, and then a female catheter was passed through, and a counter opening made upon it internally. It healed rapidly, afterwards, without any accident.

In the Popliteal Region.

February, 1852. A young man, thirty years of age, with a muscular system of medium development. He said he had never been sick. Six months before coming to the hospital, he had a fall, in which the inferior extremity of the left side was principally injured; it was not so severe, however, but that he continued to work for the remainder of the day. Eighteen weeks after this fall, six weeks before coming to the hospital, the affection for which he entered commenced to show itself, and during the whole of thât time, he had continued to work as usual. It is remarkable, how all patients refer their diseases to some external cause. At all events, whatever may have been the cause, a tumor, about as large as a penny loaf of bread, was formed in the lower and posterior part of the thigh. A physician to whom it was shown, covered it with a plaster; afterwards he made a puncture, but no pus came away; a few days after that, he enlarged the opening, and the pus followed. This was eight days before the patient's entrance to the hospital, and, since then, the pus had continued to flow.

There was an engorgement of the knee; its shape was changed; in place of the projections usually seen about the articulation, it was all rounded. Not far from the insertion of the biceps muscle, was an opening, from which pus issued. When its depth was explored, the catheter (a female catheter was made use of, for this purpose) could be pushed in different directions; towards the upper part of the thigh, it could be introduced a distance of four inches; this was subcutaneous, between the skin and the aponeurosis. It should be remarked, M. Nélaton said, that a thick instrument was made use of in making this exploration. The surgeon must take great care with these fistulous passages; above all, in the hand and in the foot. When an *interne*, he had examined a foot, after its amputation, for what was supposed to be an abscess extending from the big toe as far as the calcaneum;

he found only a small sac, and the probe used in the exploration had been passed into the sheath of the flexor tendons. Toward the lower part of the thigh, there was a separation of the skin, extending toward the external side of the knee; here, there was an opening in the aponeurosis, made by the surgeon, and when the catheter was introduced, a large abscess was found. There was then, in this case, a vast purulent collection, in two parts, one subcutaneous, the other deeply seated, and by which the popliteal space was reached. Nowhere, was any change in the bone, or denudation to be met with.

The question was, whether this collection of pus was idiopathic or symptomatic. The pains, which, in osseous alterations, can be experienced by the patient long before the abscess shows itself, may be wanting. The surgeon cannot rely upon them; he cannot affirm that, because they are absent, the abscess is idiopathic. In this case, M. Nélaton was not disposed to believe the abscess to be sympathetic of an affection of the bones; beside his inability to find any, there was not the slightest deformity in the femur; it was in every respect similar to the other. Could it possibly have been caused by an effusion of blood, after the fall? But effusions of blood are not often deep seated; nothing is more rare than that, and above all in a region protected as the popliteal.

This collection was to be thoroughly emptied, and at once, and its walls placed in contact. In order to empty it, it was necessary to make a counter-opening, so as to have one external and one internal, through which a seton could be passed. The knee would then be rendered immovable by a bandage, in which openings would be left, to allow the pus to flow away.

This young man, after a long stay in the wards, went out cured.

March, 1852. A man, thirty or thirty-five years of age, a baker, with an affection situated in the popliteal region of the right side. A month before, while exerting himself in lifting, he suddenly felt a pain there; and, from that moment, he had felt a swelling at the internal and inferior portion of the thigh.

There was nothing abnormal in the appearance of the skin; the tumor was not subcutaneous, it was deeply seated, and it extended quite profoundly into the popliteal excavation. The internal gastrocnemius muscle covered it, and formed a hard layer placed upon it. The tumor itself was soft and fluctuating; towards the superior portion, there was an edge, somewhat projecting, and quite hard, a peculiarity quite often met with, particularly in cold abscesses. The case was one of cold abscess, and it would be treated by a puncture and an injection of iodine.

When the abscess was opened, some peculiarities were found to exist. One portion of the collection was subcutaneous, and the *décollement* was very great; the aponeurosis, also, was opened, and the catheter entered a vast abscess placed behind the femur. M. Nélaton, at first, contented himself with one opening; afterwards, he made a counter-opening upon the external part of the thigh.

The knee was kept quiet, and iodine injections were used until the abscess had healed, which did not take place for a long time.

November, 1851. A man, about forty years of age, who related that, twenty years before, a tumor had formed in the popliteal region; after some time, it manifested itself to be an abscess; it was opened, and the fistulous orifice had never healed. He had been in a great many hospitals to be cured of this, but without success. At the external side of the knee, above the articulation, there was a depression, and in the bottom was the external orifice of this fistula, which extended toward the centre of the popliteal space.

In the treatment of this case, in the first place, the knee-joint was rendered immovable by a dextrine-bandage; a small opening being made over the orifice of the fistula. From time to time, iodine injections were made into it; they are good for the purpose of modifying the surfaces, and of disposing them to agglutinize. An injection is the introduction of a foreign body; it should be made slowly; and as soon as it has produced the desired modification of the surfaces, its use should be suspended. Under this plan of treatment, the fistula got well; after it had closed, the bandage was ordered by M. Nélaton to be still worn for a month.

Near the Hip.

April, 1853. A young man, who had been sent to the hospital as affected with coxalgia.

Four months before, he was enjoying excellent health, when he had an attack of sickness. As to what this sickness had been, there was nothing very positive to be learned, from what the patient could tell. It had lasted two months—that much was known; and M. Nélaton believed it to have been a typhoid fever. He got over this sickness, and commenced walking about, getting along very well for eight days, when he was seized with pains at the hip, that forced him to keep quiet. A physician, who was called in, had applied blisters, a moxa, and cauterizations, thinking the affection at the hip to be coxalgia.

Upon hearing this history, M. Nélaton doubted at once the correctness of the diagnosis. Asking the patient if he had had pain in the knee, he told him, no; and he made this inquiry of him in several ways. *Always take the first two or three answers of a patient as of no value.* This pain at the knee is a sign of extreme importance in coxalgia. M. Nélaton said he had never met with a case in which it did not exist. The appearance of the limb was not that found in coxalgia; it was rotated inwards, and in a state of adduction; in disease of the hip-joint, almost at the commencement, there is abduction and rotation outwards. Again, in this patient, the movements of the joint were easily executed; they were *limited*, but performed with ease. The absence of pain at the knee, the absence of the habitual position of the limb, and the ease of movement, showed that the case was not one of coxalgia.

When an examination was made at the posterior edge of the great trochanter, a swelling, or softness of the parts, was found. A collection of liquid was perceived behind the femur, quite deep seated, bound down by the strong aponeuroses of that region. There existed, there, a collection of pus, and its limits it was necessary to ascertain precisely. It was found to extend towards the internal face of the thigh; a collection of liquid was also found in the neighborhood of the adductors, which communicated with the other behind the trochanter. The collection was one vast abscess; the patient had had, about the termination of his attack of fever, *a critical abscess.* M. Nélaton said that this spot seemed to him to be thin *siège d'élection.* A curable affection, one eminently curable, was here to be dealt with. It was necessary to give an issue to the pus; but, in so vast a collection, the surgeon has to fear the retention of a small quantity of pus, which would lead to putrid infection. In order to prevent this, these abscesses can be largely opened; or a small puncture may be made, and an injection of iodine thrown in. M. Nélaton said he did not know which of the two ways was the better; he would, therefore, employ the more simple, and then, if it would be necessary, he could make a large incision afterwards.

The abscess was opened, and some injections made; in less than a month the patient went out cured.

March, 1852. A little boy, with an abscess developed in the upper and external part of the thigh. The information he was able to give about it was very incomplete; one month before, and before that time he had nothing the matter with him, he was seized with a chill; this was all that could be found out from him about the case. There had very probably been a local phlegmasia, for the marks of leeches could be seen over the part where the collection of pus then was.

The child was carried into the wards, suffering very much, and with the thigh and the leg in a flexed position. The length of time that the disease had lasted, forbade, of itself, the supposition of an affection of the articulation; it had progressed too rapidly for that.

An abscess, and one *very deep seated,* was found; it was opened in the following manner, which is always practised in such cases by M. Nélaton: An incision was made into the skin, and then continued into the aponeurosis, which, if there be any danger, should be divided upon the director; after its incision, a finger was introduced, penetrated between the muscles, and the purulent collection was thus largely opened, without running any risk of opening an artery. This method is almost always applicable; it can be employed in very many circumstances. After the evacuation of the pus, this abscess soon healed.

December, 1853. A young man, who had two fistulous passages in the upper part of the thigh, in the region of the great trochanter; they had existed for five years, and been preceded by no affection of the articulation.

Attention was directed to this patient, to show how readily the muscle, the tensor vaginæ femoris, might be taken for an abscess; and, particularly, in a case where there was reason to suspect the existence of a purulent collection. This muscle resembles an abscess very much, above all, when the leg is flexed, for it then forms a small globular mass. M. Nélaton warned the members of the class of this, and said he had seen the mistake made himself; he urged them to try it, by placing a healthy person on the side.

February, 1854. A young man, whose pathological history will not be given; but there was an abscess upon the superior and internal part of the thigh. Chloroform, which was used locally, in order to diminish the pain caused by the incision made in order to open it, appeared to have no effect. The opening made into the abscess was not very large; the incision was not half an inch in length. His case is referred to, in order to speak of the effect of *the tent.* A tent is a true cork (*bouchon*), M. Nélaton said, which, in place of assisting the evacuation of the pus, prevents it. When, then, one is introduced, in case reunion is not wished, it must be made *as small as possible.* When the tent, used in this case, in order that the wound might be kept open, and the pus have a free exit, was withdrawn, it was seen that it itself had completely prevented any pus from coming out; not a drop could issue until it had been withdrawn.

Purulent Infection.

Purulent infection, purulent absorption, purulent metastasis, diathesis, and phlebitis, are names given to a febrile affection, which has been supposed to be owing to the introduction of pus into the circulation. The mortality it causes in the Parisian hospitals, is frightful, as may be judged from the cases reported in this volume, where it is so often spoken of, that we may be permitted to speak very briefly of it here. There are, however, a few things worthy of mention not elsewhere referred to.

The affection is always preceded by local inflammation of the vein, or veins; and then, at the moment when the disease is propagated, and the infection commences, a chill almost always occurs. The course of this affection is marked by chills, which occur at irregular intervals; and abscesses form in the lungs and liver, and purulent effusions in the pleura and the articulations. Pus, injected into the veins, gives rise to symptoms analogous to those just mentioned. Six or ten hours after this injection, the globules of the pus can no longer be found, and it is at about this time that the symptoms of purulent infection take place. It is probable that they disappear by liquefaction, and determine an alteration of all the organic substances of the blood by catalytic molecular action, which causes the symptoms that soon appear. Some most interesting researches on the microscopical examination of the blood, of the products of the inflammation of the veins, and of the tunics composing them, and of the metastatic abscesses which result, without which it is impossible to have complete doctrines on phlebitis, and on "purulent intoxication," will be found in Lebert's *Physiologie Pathologique*, under the head of *Inflammation of the Veins.*

As respects the localization of the abscesses in such or such an organ, nothing precise is as yet known on this subject; this much, however, is most certain, namely: that they do not come from pus formed in the inflamed veins, and retained by the capillaries too small to allow them to pass. It is pus of new formation, which has been formed on the spot, and has not come from a distance. It is equally certain, that the condition of the vascular walls has some influence on that of the coagulable organic substances of the blood, on the fibrin in particular; that inflammation determines the coagulation of the fibrin at the seat of the inflammation, in the scarcely moving layer adhering to the internal surface of each vessel at first, and then by degrees in the whole thickness. This influence is so instantaneous and so rapid, that there is reason to believe that the coagulation takes place before the production of the pus. It is not astonishing, therefore, that in almost all, if not all, of the cases of phlebitis, a clot is found in both ends of the divided vein. The pus produced before the formation of these clots, and which might thus be taken into the circulation, is, therefore, always in very small quantity, even granting this introduction to be proved.

The opinion of those who have described the phenomena of purulent infection, under the name of *pyogenic fever*, may be the correct one. It may be primitively caused, as are the greater number of the general affections, febrile or not, by a primitive alteration of the organic substances of the blood; an alteration caused by the unfavorable condition of nutrition with which an operation or a delivery may be attended, especially when they take place in a respirable medium as bad as the wards of hospitals are; and this alteration of the organic substances would lead to the production of pus in the lung, the liver, &c., the spleen, and in the lymphatic glands.

When the pus remains in cavities to which the air has access, it gives rise to the production of fetid gases, and to the putrefaction of the organic substances. These liquid products of the decomposition of the pus, are all the time being absorbed, and their introduction into the blood determines, by contact, an alteration, which differs from the alteration produced in purulent infection, and which gives rise to symptoms known as those of *putrid infection.* Putrid infection differs from purulent in this, that individuals attacked with chronic suppuration, with alteration of the pus, resist for months the attacks of fever (hectic fever), which are not attended with the violent chills observed in purulent infection. Putrid infection can be cured by preventing the stagnation, and, in consequence, the alteration of the pus; while, when purulent infection once declares itself, the surgeon in vain occupies himself with the local condition of the wound, or of the abscess.

CHAPTER VI.

FRACTURES.

Fracture of the Rib.

MAY, 1852. A man, who had fallen in such a way as to strike the left side of the body forcibly against a table.

At this point, it was easy to recognize the abnormal projection of the tenth rib. When the hand was placed upon it, and the man made to cough, a dull crepitation was felt, and the projection disappeared.

There was not the slightest complication; nothing on the part of the lung, no emphysema, no effusion of liquid. On applying the ear to the spot, a friction sound could be detected; the rubbing together of the opposite surfaces of the pleura. When the man was reclining on his back, he did not suffer at all.

Nevertheless, when a circular bandage was applied so as to keep the ribs immovable, and force the patient to breathe by the diaphragm, he suffered so much pain, that it had to be removed. Afterward, he did not suffer at all. It is not uncommon to see this; and, in these cases, when the patients do not suffer, no bandage need be applied, and the cure will not be any slower.

In order to satisfy this patient, a bandage was applied, but it did not exercise any pressure. After a few days, he went out.

If nothing intervene to prevent it, a fractured rib is consolidated in twenty-five or thirty days.

Fracture of the Clavicle.

July, 1853. A very simple case, but one very often seen; a fracture of the clavicle. It was a type case; the fracture was in the middle part, and transverse, and the external fragment had placed itself beneath the internal, so as to form with it an obtuse angle, looking downward.

The limb was kept immovable, by means of the handkerchief of Mayor, and the man went out well in thirty-five days. No deformity could be seen; there was no difference visible between the right and the left sides, and all the movements of the limb were as free as ever. By the touch, however, the deformity could be felt; the displacement had persisted, and it generally does, M. Nélaton said, in spite of whatever apparatus the surgeon may employ.

The apparatus of Mayor is as simple as possible. The fracture is reduced, and the elbow then carried towards the body, and directed forwards, the forearm half-flexed on the arm; no wedge-shaped cushion is made use of. The handkerchief to be used ought to be so large that, when folded diagonally, it can go around the chest; the base of the triangle is then applied a few inches above the elbow, and tied behind; the two angles, forming the summit of the triangle, are then hanging before the forearm and the abdomen; these two angles are passed between the forearm and the body, and drawn up; two pieces of bandage are then attached to the two angles, and they are passed, one over the sound shoulder, the other over the fractured clavicle; sufficient traction is then made on the two angles to sustain and raise up the limb, and the pieces of bandage are fastened to the posterior part of the girdle formed by the handkerchief.

The three indications to be fulfilled in the treatment of fractures of the clavicle, are, to keep the shoulder upward, outward, and backward. According to M. Nélaton, no apparatus prevents the displacement of the fragments when it exists, and their only effect, whatever care be taken in their application, is to keep the limb motionless. As the deformity is inevitable, at least in adults, whatever be the apparatus employed, it is evident that the one which is least annoying should be preferred. It should be added, besides, that this consolidation with deformity does not interfere, in the least, with the free exercise of all the movements of the limb.

Fracture of the Humerus.

June, 1852. The glazier, whose case is spoken of elsewhere as having received a fracture of the cranium, by falling from a third story window, had also a fracture of the humerus, situated immediately above the elbow.

The deformity of the arm, in this case, presented something peculiar, something extraordinary. Generally, the articular fragment is drawn backward and upward by the contraction of the triceps muscle, which is inserted into the olecranon; the olecranon forms a very great projection at the posterior part of the elbow, and in front is found a hard, rough projection, formed by the superior fragment, raised up by the brachialis anticus and biceps muscles. Here, on the contrary, the inferior fragment was drawn forward. This was attributed, by M. Nélaton, to the fracture having been, from before, downward and backward, and that the inferior fragment had slipped upward and forward.

It was necessary to know if there was not an interarticular fracture. But, in those cases, there is always an effusion of blood into the articulation, and here there was no sign indicating a communication with the joint. There was, upon the posterior part of the arm, a small wound in the integuments, and there was some doubt as to whether it did not communicate with the seat of fracture. The day after the man was brought in, twenty-five leeches were applied to the elbow.

In the treatment of fracture of the inferior extremity of the humerus, various apparatuses are employed by surgeons. There are some who always place the limb in an extended position. But, a fracture here can lead to anchylosis of the elbow-joint, and most surgeons prefer a slight deformity to the serious inconveniences resulting from an arm anchylosed in an extended position. M. Nélaton placed the limb in a demi-flexed position, a compress was applied over the projection behind, and a splint, the length of the humerus, was then placed over this compress, and held in position by a circular bandage. Two days afterwards, the fragments being in their proper position, an immovable apparatus, composed of starched bandages, compresses, and an anterior and posterior pasteboard splint, was applied. It was removed the third week, so as to give slight movements of flexion and extension to the limb. This man, notwithstanding the serious nature of his injuries, recovered from them, and left the hospital with a very good arm. The elbow-joint was still stiff, but M. Nélaton thought that, in a few months, the freedom of motion would return.

January, 1853. A young man, who had fallen in the street, and, while upon the ground, the wagon he was conducting passed over his arm. He came to the hospital with the signs of a fracture of the humerus at its inferior extremity.

The appearance of the limb was quite curious; it was that seen in a luxation of the elbow backward. This displacement is the one generally seen; it is the normal displacement in this fracture. The existence of a fracture does not exclude the existence of a luxation; and this was carefully sought for. The limb was much swollen; and this, as is well known, creates sometimes very great difficulties in this exploration. There is, however, a way of making the diagnosis; and M. Nélaton desired to impress upon the students the utility of making use of it. It consists in ascertaining the position of some certain points; and when they can be found to be in their normal situation, that suffices to establish the integrity of the articulation. A swelling, from effusion, can be made to disappear from any place, by keeping the thumb pressed against it for a sufficient length of time. At the olecranon, there was an angular projection and crepitation; but sustained pressure showed them to be owing to the presence of one of those bloody tumors, formed by effused blood, and the immobility of the parts was determined.

To reduce a fracture of the arm, the patient should be made to sit up, either on a chair or in bed. The fractured limb should be held out from the body, and maintained in a horizontal position. An assistant, placed on the sound side of the patient, makes counter-extension, by seizing the shoulder with his hands; another assistant, in order to effect extension, flexes the forearm at a right angle; applies one hand to the upper part of the forearm, and then exercises, by the aid of this hand, a traction parallel to the axis of the humerus, while his other hand sustains the wrist and forearm, which is thus transformed into a lever of the third order, of which the fulcrum is at the wrist. To reduce the fracture, the surgeon embraces the inferior extremity of the arm, crosses his fingers over the projection in the front of the elbow, while, with his thumbs, he presses upon the olecranon, and pushes it forwards.

Starched bandages were applied, as in the preceding case, and with an equally good result. The man left, forty days after the injury had been received.

June, 1853. A man, fifty-five years of age, fell into a cellar, on his right shoulder.

His shoulder was deformed, as was seen at the first glance. There was general tumefaction of the parts there; the depressions above and below the clavicle were gone, and on the other side of the chest they were well marked, for the patient was old and thin; the posterior part of the shoulder, also, was greatly swollen.

By the touch, other things, far more important, were detected. In exploring a part by the touch, *do it so that the patient does not suffer; when a patient suffers, you ascertain nothing by palpation.* When you wish to ascertain the existence of a deformity, look, first, where the parts should be in their normal condition. The patient's arm was sustained, so as to relax the deltoid, and the acromion was felt; immediately below, was the head of the humerus, almost touching it, as in its normal position. Not satisfied with finding the head, and seeking whether it was there entire, M. Nélaton followed it with his fingers, and came to an edge under which the fingers could be passed. There was evidently a fracture of the neck of the humerus; the upper fragment was left in its place, and the lower was carried into the hollow of the armpit. Here, one of the ordinary signs of fracture of the neck was wanting—the flattening of the external part of the deltoid region; the condition of the bone, that is to say, the position of the fragments, was the proper one to cause this, but it was prevented, here, by the great effusion of blood. Crepitation could be perceived, but it was very obscure. To make it, the lower part of the humerus was seized in one hand, and seeking the upper fragment with the other hand above, by rotating the limb, crepitation was felt: it was obscure, as said before, but sufficient, however, to confirm the diagnosis. The ecchymosis, at the time M. Nélaton was speaking, twenty-four hours after the accident, had not yet been produced; three days after this fracture, there is an ecchymosis, above all, in the groove between the deltoid and the pectoral muscles; the blood comes out there from beneath the deltoid. This fracture, like that of the neck of the femur, is more common in advanced life than at any other time; the authority of Sir Astley Cooper has led surgeons into error on this point.

Was it proper to reduce this fracture? This question, M. Nélaton said, at first, might seem a strange one; but it would not, upon reflection. Reduction could be thought of, to prevent the accidents arising from the presence of the rough extremities of a broken bone; to remedy deformity; and, thirdly, to preserve the integrity of the functions of the limb. As to the first, experience has not shown these symptoms of inflammation to follow leaving the fragments in position, while they have followed the attempts to reduce them—the traction and the pressure made upon the parts around. As to the deformity, that was not to occupy the attention of the surgeon, in a case where the patient was so aged. As to the third reason for attempting the reduction, only one movement appeared to be compromised by this fracture, namely, the elevation of the arm at the side of the body. This fact has been determined and explained by M. Malgaigne. He found that the upper fragment tended to undergo a movement, turning the fractured surface directly outward. The lower fragment is then united to the head angularly, the head turned up as much as it can be, in the above-mentioned direction. Moreover, it was very probable that attempts to reduce the fragments would fail; for very often, in this fracture, one of the pieces is driven into the other. These considerations induced M. Nélaton not to attempt reduction, and to limit himself to keeping the arm immovable, so that the fragments might become firmly consolidated. As to the method of *gradual reduction*, of Boyer, by means of a cushion in the armpit, he had renounced that long before.

The arm was allowed to fall alongside of the body, without anything being placed between it and the limb, for the purpose of forcing outward the superior extremity of the lower fragment. Attention was called to the fact that, in these cases, when the patient is in bed, the elbow tends to fall backward; this makes the upper extremity push forward, so as to raise up the anterior portion of the deltoid muscle; and it should be prevented by the arrangement of the bandage. The bandage employed to keep the arm immovable, was the one described as used in the case of fractured clavicle.

This patient left the wards in about seven weeks. The functions of the limb were not sensibly altered by the injury, except the movement of elevation.

A point worthy of notice in the treatment of fractures of the humerus, is the rejection of the precaution most surgeons employ, of surrounding the hand and forearm by a circular bandage, to prevent the œdematous swelling of the lower portion of the limb. M. Nélaton has found, by experience, that this swelling is far from presenting the dangers usually attributed to it; and that it goes away in twenty-four or thirty-six hours after the removal of the apparatus covering the fractured bone. The freedom of the movements of the limb appears to him to be re-established much sooner than when the hand is kept motionless all the time of the treatment.

Fracture of the Forearm.[1]

December, 1851. There were two cases of fracture of the forearm in the wards at the same time; in one, there was a fracture of the radius alone, caused by a gun-shot wound received at a barricade; in the other, by the fall of a very heavy body on the limb; both the bones were broken, and the extremity of the radius was projecting from a wound in the integuments.

In the first case, an incision was made to enlarge the opening at which the ball had come out, that one being chosen because it was on the anterior face, and it was intended to place the limb in a certain position, by which that opening would be made the lower. This incision, which was made parallel to the axis of the arm, was for two objects—to facilitate the issue of the suppuration which would necessarily take place after the injury received, and for the extraction of foreign bodies: pieces of clothing driven into the limb. For some time, there was diminution of sensibility in the limb, from the violent contusion of the nerves, which is generally seen to occur, but by degrees it was entirely re-established. The surgeon need not be worried by this diminution of sensibility, for the nerves resist the action of a ball better than all the other tissues.

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[1] See Fracture of Leg.

In the other case, both the bones were fractured, and, of course, there was danger of their becoming joined together. It is a disputed point, what position should be given to the limb, in these cases of fracture of the forearm, in order that the interosseous space may be best preserved. M. Nélaton himself places it in pronation. It is objected to this, that in this position the two bones cross each other. This is very true, but the interosseous space is just as large as in any other. The vertical position, between pronation and supination, in his opinion, is the worst of all. In order to separate the two bones, a compress should be properly adjusted, and it must be done with care, for gangrene is more often seen after fracture in the forearm than anywhere else, and entirely on account of these compresses. The situation of the two arteries must be borne in mind, and an apparatus used, which permits of the pushing of the muscles into the interosseous space, without pressing too much upon these vessels. By means of his thumbs, M. Nélaton separated the two bones, and then placed a cork so as to keep them in that position. It can be applied with great advantage when there is much displacement, and it is difficult to hold the bones in position. In both these cases the patients recovered, and left the hospital with good limbs.

December, 1853. A young boy, employed in a steam printing-office, had his forearm fractured by being dragged into the fly-wheel of the machinery. The cubital border of the arm was very convex and greatly swollen, and when examined, the ulna was found to be fractured at the upper extremity. The inflammation was combated, and when, at the expiration of several days, it was possible to make a thorough examination of the condition of things, a fracture of the upper extremity of the radius, still nearer to the elbow-joint, was also detected.

M. Nélaton called attention to this patient, in order to warn the students against giving too favorable a prognosis in these cases. The disposition of things, three weeks after the accident, was as follows: The upper fragment of the radius, which was in pronation, was carried forward; the upper end of the lower fragment made a projection behind and outward; the ulna, fractured further down, had its upper fragment internal to the other. The difficulties resulting in the motions of the arm, if these parts were not well joined together, can be easily understood. But what was to be done? There was no possible way of remedying this condition. The riding of the fragments over each other was very considerable; the fractured arm, at that time, was nearly an inch shorter than the other, and the bones were about to unite in that position.

The upper fragment of the radius was pulled by the biceps muscle as far outward as possible, and if it became united by bone to the lower fragment, there could be no motion. M. Nélaton thought it would be more favorable not to permit bony union to take place in that position, but that a false joint would be preferable. This had never been done, but he could not see that any harm would result from trying it. Every day movements were impressed upon the radius, care being taken not to move the ulna, for it would have been a great misfortune if both bones had formed a false joint.

January, 1854. A young boy, ten years of age, entered for a fracture of the lower end of the radius, received in a fall. He said he had fallen with his hand much flexed, but it is not an accident usually resulting from such a fall; it was infinitely probable that he had fallen with his hand extended, in what might almost be called the *official* position.

Attention was called to this case, for such a fracture is often mistaken; and it is so common, that every year a surgeon in good practice will meet with twelve or fifteen such cases.

To recognize it, it is the peculiar deformity it gives rise to, and not crepitation, that must be sought for. To see it, the arm must be raised up and regarded in profile, either from the radial or the ulnar edge. The dorsal face of the hand and the wrist, in place of being found on the same plane as the posterior face of the forearm, is elevated above its level; a projection is then found, one or two finger-breadths above the radio-carpal articulation, and beneath this projection a depression exists, into which the fingers can easily be pushed. On the palmar face, the disposition is inverse; in place of a concavity, the inferior part of the forearm offers a very pronounced convexity, and carrying the fingers a finger's breadth above the fold of skin separating the forearm from the hand, a rough, transverse projection is found, upon which the flexor tendons are reflected. This deformity—called by M. Velpeau *en dos de fourchette* (like the back of a fork)—is so characteristic, that a simple glance is sufficient to make the surgeon sure of the diagnosis. The only cause of error is the existence of an old fracture, badly consolidated.

Besides, an exaggerated projection of the inferior extremity of the ulna is perceived, become more prominent by the lateral movement of the hand towards the radial border of the forearm.

There were other signs of a fracture, removing every possible doubt as to its existence, and allowing its seat to be more precisely located. Crepitation existed here; generally, it is not to be detected in this fracture; in at least nineteen cases out of twenty it cannot be felt. There was abnormal mobility. There was no ecchymosis in this case. Local pain is, it must be said, a most excellent sign of fracture; by pressure, a painful point was found, corresponding to the external edge of the radius, a very little more than half an inch from the extremity of its styloid process. There was, besides, a painful point, directly at the base of the styloid process of the ulna; this was not fortuitous; this seat of local pain was known to the surgeons of the last century, and it may be considered as almost constant in fracture of the inferior extremity of the radius.

This patient was so young that the epiphysis was not yet united by bone to the body of the radius, and the injury might be supposed to be a simple detachment of the epiphysis. But M. Nélaton said he had dissected this injury in a young girl, seventeen years of age (the inferior extremity of the radius is not united to the body of the bone before eighteen or twenty years of age); there was a solution of continuity in the part; but here, it was in the cartilage, here, in the epiphysis, here, in the diaphysis, so as to be as much a fracture as a detachment. This autopsy was on a young girl who had nymphomania, and after in vain entreating every person in the hospital to gratify her desires, she threw herself from the roof of the building; her two arms struck the ground first, but not arresting her body, the head struck, and she was instantly killed.

In this boy's case, the fracture was higher behind than before, and it also ascended higher on the radial side of the arm than the ulnar. The fragments can be driven into each other; in this case, the upper fragment was driven into the lower, and apparently more on the radial side than the other. In the immense majority of cases of fracture of the inferior extremity of the radius, the bone is broken two-fifths of an inch from the end. The pain at the styloid process of the ulna was owing to the fact that this process was broken at its base. This happens in a great many cases, and the reason of it does not at once appear, for it seems to be out of the line of fracture. The pressure is thrown upon the radius, by the fall upon the hand, but there is a strong fibro-cartilaginous ligament attaching that bone to the extremity of the styloid process of the ulna; an arch is formed by the two bones, and in a fall in which it is forced violently upon the convexity of the bones of the wrist, one tends to go to one side, and the other to the opposite; the bones tending to separate, the triangular ligament resists, and the process is torn away.

These fractures are easily reduced. The best way is to apply an apparatus, which shall have the effect of pushing the parts into place. In this way, the deformity would be made *almost*, if not totally, to disappear.

The apparatus applied consisted of four compresses, exerting pressure in opposite directions, in front, behind, and at the sides, and of three splints, one dorsal, one palmar, and one ulnar, none of them reaching as far as the fingers; the whole was retained in position by adhesive strips.

Thirty-one days after the receipt of the injury, the boy went out cured. The deformity on the dorsal face was almost gone, on the palmar more could be seen, but, in either case, an experienced eye was required to detect it.

December, 1852. A man entered the hospital who had fallen on the palm of his hand. After merely glancing at the arm, M. Nélaton said there was a fracture of the radius.

The deformity of the lower part of the forearm was not exactly the same as that seen in fracture of the radius; the deformity of the palmar face existed, but there was none of the dorsal.

This patient complained so much of a pain, seated exactly where the styloid process of the ulna terminates, that M. Nélaton's attention was attracted by it, and, by a careful examination, it was found that this process had been fractured, while the radius itself was entire.

In a fall upon the palm of the hand, the hand, forcibly turned backward, forms, with the forearm, almost a right angle, and presses them directly upon the kind of arch offered to it by the first row of carpal bones. All that this great pressure could do, would be to crush, so to speak, this arch, without making the bones composing it lose their normal relations. The radius tends to slide on one side, and the ulna on the other; and the two bones, thus tending to separate, the styloid process attached to the extremity of the radius by the triangular ligament can be broken off. In this case of fracture of the styloid process of the ulna, and not of the radius, the ecchymosis made its appearance on the back of the hand, and not towards the forearm. *The situation of the ecchymosis in fractures is a point worthy of being remarked, and it is one generally neglected.*

Fractures of the Femur.

December, 1851. A man, fifty years of age, whose right femur had been fractured by the passage of a bullet through the thigh, while fighting behind a barricade.

The bullet had passed through the middle of the thigh, transversely, and from before backward. The two openings, of entrance and of exit, made by a bullet, do not resemble each other- For the entrance, there is crushing attrition of the tissues; where it comes out, they are burst open. Whilst the latter opening tends to become smaller, sometimes healing, in great part, by first intention, the former becomes larger.

In the treatment of the case, an apparatus was applied to keep the fragments of the bone immovable, and in order to prevent inflammation, cold applications were made use of; a constant refrigeration of the limb, by means of a stream of cold water, was maintained.

Three days afterward everything looked very favorable; there was an effusion in the articulation of the knee, but that was of but small importance, as it is quite often seen in fractures of the femur.

On the fourth day, there was agitation and delirium; signs of purulent absorption, which had made their appearance, although large openings had been made to allow of the free exit of the purulent discharge.

This patient died on the seventh day.

February, 1853. A man, who had been thrown down by his wagon, the wheel of which afterward had passed over the upper part of the left thigh, and the middle of the right.

There was a fracture of the right femur at the union of the upper two-thirds with the lower third of the bone. There was a displacement of the fragments; the inferior one being carried outward and backward. They were brought into their proper position, and to maintain it, the bandage of Scultetus was applied, and two splints, the length of the limb, were placed one at each side, and held there by circular bandages. The next day the parts seemed perfectly well disposed.

By degrees, the swelling of the parts went away, and when the limb became much thinner, it was found, upon examination, that the position of the lower fragment had entirely changed; it was then internal to and in front of the other. It was found, moreover, that they rode over each other to a certain distance; the measures, which were taken several times, as should always be done, gave thirty-four inches as the length of the limb, on the right side, and thirty-five and one-fifth on the left. It was then the twenty-eighth day of the fracture, and the question was, whether anything was still to be attempted to remedy this shortening. The fragments were still movable. In order to try if, by the aid of permanent extension, the cure might not be effected without shortening, the apparatus of M. Martin was applied. Some cases, M. Nélaton had seen, induced him to think that it was not too late to hope for such a cure.

This apparatus of M. Martin is exceedingly complicated. When it is applied, the thigh is in a flexed position; the leg is fastened below, and counter-extension is kept up by two bands passed in the groins and fastened above. The traction upon the fractured extremities of the femur is regulated by screws, properly adjusted for that purpose. It is an apparatus of permanent extension, used on a flexed limb.

The man complained a great deal of pain, caused by the apparatus, and, for some days after its application, he had fever. After it had remained twenty-six days, it was removed, and the limit was found to be exactly as before. Nothing had been gained, therefore, by the apparatus, but nothing had been lost. It would not do to judge of it too hastily. M. Nélaton said he did not renounce its use, and he would try it again in a more favorable case. A dextrine[1] bandage was then applied to the thigh.

Three days afterwards, M. Nélaton was surprised to find both limbs œdematous; even the knee-joints were attacked with effusion. His first idea was, that it was owing to phlebitis, but the symptoms did not correspond exactly with those met with in that affection. Phlebitis never causes an effusion into the articulations; again, both limbs here were affected, and the inflammation, therefore, must have been in the inferior vena cava, and there was nothing to indicate that.

This œdema of the lower extremities was attributed to profound cachexia, and the treatment was in accordance with that belief. Good diet, quinine, and other tonics were administered, and spirits of camphor, as a tonic friction, was rubbed upon the lower extremities.

The man left the hospital, after having remained in it for more than two and a half months. The fracture was well consolidated; the shortening of one and a fifth inches, of course, still persisted.

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[1] Dextrine was first used by M. Velpeau, in place of starch, in the preparation of immovable bandages. The best mixture is composed of a hundred parts of dextrine, sixty parts of spirits of camphor, and forty parts of water. These proportions are those that give the greatest solidity, and that permit the apparatus to dry most rapidly. These substances should be mixed in the following manner: The dextrine being placed in a basin, the spirits of camphor (or ordinary brandy) is immediately added, and worked up with it until the mixture has acquired the color, consistence, and transparency of honey; this done, the warm water is added, and after one or two minutes of agitation, the solution is accomplished. A circular bandage is soaked in this mixture, carefully pressed, and then applied to the limb, previously covered by a dry bandage. The exterior is then coated with what remains of the mixture.

In order to facilitate the drying of the apparatus, the limb is suspended in three or four bands, attached above, and coated with cerate, so that they may not adhere to the apparatus as it dries.

November, 1853. An old woman died in the wards, with ascites, from cancer of the liver. She had entered five months before, after a fall upon the hip, with signs of a fracture of the neck of the femur, and a fracture within the capsule. No apparatus whatever had been applied to the limb.

A fracture, observed in a woman who had a cancer of the liver, might have led to the supposition that the bone was affected; this was not the case. Moreover, a surgeon would be disposed to give an unfavorable prognosis in a fracture occurring under such circumstances. When, in a patient affected with cancer, a fractured bone does not consolidate, it does not, because there is some cancerous matter *at that point of bone;* when there is not cancerous matter at that spot, it consolidates as usual.

In this case, there was bony union between the fragments. There was a difference in length in the two femurs of two-fifths of an inch. No apparatus, as said before, had been applied to keep the fragments in position. The fracture was *intra*-capsular, completely so, in all its extent; it followed the edge of the articular *calotte.* The displacement was this: the body of the femur had undergone rotation, the anterior and internal portion had been carried forwards; posteriorly, the neck was driven into the head of the bone, while anteriorly, the fragments were separated. In some cases, it is the base of the neck which is fractured, and in these cases, again, it is the neck that penetrates, being driven into the great trochanter.

The specimen was afterward divided by a saw, so that a true bony union between the fragments was made most evident; the penetration of the posterior part of the neck was also more plainly seen.

Fracture of the Patella.

May, 1853. A young man, with a fracture of the patella from direct violence to the front of the knee. There was very considerable effusion into the articulation. The fracture was transverse; the separation of the fragments was but slight.

After waiting until the swelling of the parts had entirely disappeared, the leg was placed in extension, and then the parts having been previously oiled, *as quickly as possible* bandages soaked in plaster[1] were applied. The bandages were hard in seven or eight minutes, during which time the fragments of bone were held together by the fingers (previously oiled).

M. Nélaton said that he had used, several times, the instrument of M. Malgaigne, in order to keep the fragments of the fractured patella together, and that he had never found any of those inconveniences to result from its use, which have been so singularly exaggerated. This instrument is a double tenaculum, one hooked extremity of which is fastened into the tendon above the bone, and the other into the ligament below; by means of a screw, these two extremities can be brought toward each other and then fixed.

At the expiration of thirty-five days, slight movements of flexion were made at the joint; every day, these movements were increased, and, some time afterward, the patient was allowed to walk. In this case, in all probability, there was bony union between the fragments. This is the exception, but, contrary to what Sir Astley Cooper says, consolidation of the patella by osseous tissue does sometimes occur; in the museum of Dupuytren there is a specimen, showing it beyond a doubt.

Under the head of Hydrarthrosis of the Knee, will be found a case in which the patella was fractured.

Fractures of the Leg.

The skeleton of the leg, as that of the forearm, being formed of two bones, which can be broken together or separately, the history of these fractures comprises three distinct parts; solution of continuity of both bones, generally designated by the name of fracture of the leg; solution of continuity of the tibia; and solution of continuity of the fibula. In a work of this kind, on clinical surgery, it is thought best to arrange all under the same heading; placing, first, the cases in which both bones are broken, then, the fractures of the tibia, and lastly, those of the fibula; in the forearm, fractures of the ulna precede those of the radius.

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[1] The mixture used was composed of equal parts of warm starch and of very dry plaster of Paris. It has the advantage of becoming solid almost instantaneously.

January, 1852. A man, in a state of intoxication, who had fractured his leg, it was said, by a fall. The fracture was detected immediately when he was brought in, at which time there was very little tumefactiŏn about the seat of the injury. The limb was kept quiet by splints and bandages, loosely applied.

The next day, the tumefaction was very great, and the diagnosis of the fracture was very difficult. Tumefaction is observed after fractures, but not to this great degree; if, however, the patient walks afterward on the limb, as one in a state of intoxication might do, the fracture, which at first seemed simple, would, at the end of a day or two, be complicated by this great swelling. It is difficult, under such circumstances, to detect the fracture by crepitation, and indeed, in such cases, on account of the excessive pain it would cause, it should not be sought after. *When the surgeon examines a patient, he should not make him suffer.* There is another sign, quite as good as crepitation, which is *abnormal mobility.* By this, a fracture of the tibia was ascertained. For the fibula, to find the precise seat of fracture, pressure was made all along that bone, in order to find where the patient suffered most. This spot was found to be much higher up on the fibula, than the place of fracture in the tibia. In the tibia, the seat of fracture was at the union of the lower third with the upper two thirds of the bone; in the fibula, it was at the union of the upper third with the lower two thirds.

This difference in the situation of the fracture in the two bones, is not without importance in the prognosis, and in the treatment of the case. For, when fractures are thus situated, the shortening of the limb is almost impossible, on account of the interosseous ligament. In order that this may take place, a very extensive destruction of this ligament must exist.

There is another displacement, quite often observed, and which was quite marked in this patient, namely, an anterior projection of the superior fragment of the tibia. This displacement depends upon two causes; the muscles, here, are like the string of a bow formed by the bones; and the configuration of the leg, a large mass at the calf above, and a hollow place below, when the limb is placed upon a horizontal surface, of course, this mass tends to push forward the superior fragment.

At first, in cases where there is so much tumefaction, attempts to reduce a fracture should not be made. The tension of the soft parts, the inflammation of the skin and the cellular tissue, render the reduction difficult and dangerous. It is best, moreover, to reduce such a fracture to the condition of a simple fracture, before applying an apparatus which is intended to remain; for, the tumefaction will tend to increase, and render the constriction too energetic, or, on the contrary, it will yield to the compression, and the limb will no longer be exactly confined by an apparatus become too large.

Cold applications were made to the limb, and, after a few days, the swelling and inflammation having subsided, the fracture was reduced without difficulty; great care being taken, in making pressure, not to press upon the projecting extremities of the fractured tibia.

Recourse should always be had, first, to simple means of making this reduction; but when they are not sufficient, the apparatus of M. Malgaigne may be employed. This apparatus consists of a semicircular piece of iron passed over the limb, and attached, at its extremities, to a piece of wood placed horizontally beneath the limb, and separated from it by a cushion, for the purpose of protecting it from the pressure; through the uppermost portion of the iron semicircle, a screw is passed, terminating in a fine point. This point penetrates the integuments, but it is so small that it causes no flow of blood, and presses upon the projecting bone. This apparatus is very powerful. As a general rule, the prick in the skin does not suppurate; it causes no pain, and no inflammation in the parts around. There is also another method, by placing the leg in a state of demiflexion, and on its external side. M. Nélaton said, he could not tell why this method was no longer employed; it relaxes the muscles, which, as said before, acting as a string upon a bow, tend to force forward the fragments, and, again, the calf cannot press upon the superior fragment.

To keep the parts in position, after their reduction, the bandage of Scultetus was applied, and an immovable apparatus of dextrine. The patient left the wards at the expiration of fifty days, cured, with no shortening, and very little deformity.

November, 1852. A very curious fracture in a man, who, being engaged among some machinery in motion, was caught in it. He felt that the lower part of his leg was forcibly carried inward, and the superior part of the thigh outward. The limb yielded, and this deformity was produced; a great projection on the external lower portion of the knee, and, a few inches lower down, on the opposite side, a depression; the lower part of the leg was carried inward, the upper outward.

This deformity was owing to a fracture, in a longitudinal direction, of the tibia, of the internal tuberosity of that bone; this fragment, which was about two inches in length, had remained in place, while the external tuberosity had been luxated outwards.

When brought to the hospital, there was a vast effusion, that extended up one-fourth of the length of the thigh, and down to the middle of the leg. The injury was one of the severest kind; one for which some surgeons advise the amputation of the limb. In the course of the preceding twelve months, there had been, in M. Nélaton's wards, two cases of fracture, penetrating into the articulation at the knee, by solution of continuity in the femur, and both died in consequence of inflammation of the joint.

When the swelling of the parts had sufficiently subsided, an immovable apparatus was applied. When the man left, at the end of two months, the fragments had firmly united, a groove being plainly felt where the separation had been. There was not much stiffness of the joint, recourse being had, early, to gentle movements, in order to prevent anchylosis.

March, 1854. A woman, who had fallen in the street, the leg under the body, so as to receive its weight; she felt something break, and, being unable to walk, was placed in a cab and conveyed to the hospital. Her left leg was much swollen in its inferior two-thirds. She was placed in bed, in a suitable position, and a flaxseed poultice was applied to that part of the limb.

In the course of a few days, the swelling had almost gone; what remained was much harder than it had been at first, and the parts were felt to be very tense. Upon the internal face of the tibia, which can be easily explored, for it is subcutaneous, about one and three-quarter inches from the ankle-joint, an angular projection was felt, easily perceived to be of the superior fragment of the fractured tibia.

Beside the deformity, other signs of fracture were sought for; not because they were necessary in the diagnosis, but in order to judge of their value. Slight pressure was made, everywhere, to find the situation of the *local pain;* it did not correspond to what had been expected; the patient felt the sharpest pain when pressure was made about one and a quarter inches above the projecting extremity of bone. This sign, nevertheless, is a most excellent one, and there may have been some splinter of the bone, or something peculiar in this case, to account for what was noticed.

It remained to see if there was not also a fracture of the fibula. In place of seeking for crepitation, which is very painful, M. Nélaton examined if the extremity of the leg could be flexed from side to side; here, this abnormal mobility did not exist, and M. Nélaton was satisfied that both bones had not been broken.

This fracture was a very simple one; the patient had known at once that it had taken place, and, immediately, had come to the hospital. When a patient, as they often do when intoxicated, continues to walk, and the fragments tear the soft parts, it is very serious. Here, there was not a trace of phlyctæna, the absence of which, M. Nélaton said, was for him the sign of a fracture in its most simple condition.

M. Nélaton thought it was not proper, at that time, to annoy the patient, by attempting to make the slight projection of the superior fragment disappear; in a few days, when the parts were less tender, he would try; even if the projection remained, it was of no importance.

When the swelling and the inflammation had disappeared, the limb was placed in an immovable apparatus, composed of dextrine bandages and paste-board splints. These apparatuses are very advantageous in fractures of the leg; indeed, they maintain the fragments in apposition here, better than anywhere else, for they are connected with the internal face of the tibia in its whole extent. They embrace, exactly, the extremities of the two bones of the leg, which not being covered by a great thickness of soft parts, are not subject to diminish in size, and they offer, in consequence, a solid support.

This patient went out, at the end of forty-five days, cured, with a very slight projection of the superior fragment.

March, 1854. An old man, in a state of intoxication, was thrown down by a coal wagon, the wheel of which passed over his left leg. When brought into the hospital, his leg was placed upon a cushion covered with oil-cloth, so that a stream of cold water might be made to flow over it in the usual way, and it was kept immovable by means of straps of vulcanized India-rubber, passed around the foot and under the groin, and made fast to the supports at the foot and head of the bed. This apparatus was found to answer so well that it was not changed.

When the man entered, the condition of the leg was as follows: on the anterior and external portion of the middle of the limb, was a vast wound six inches in length, with a separation of the soft parts so great, that the hand could be placed in it between the integuments and the muscles. The aponeurosis was torn, so that the tibia was visible, broken so obliquely that the distance between the extremities was nearly four inches; the lower point of the superior fragment projecting below, and the upper point of the inferior projecting above. The bone, however, had not been crushed, there were no fragments. The wheel was supposed to have acted, chiefly, by rubbing the leg, and not to have passed directly over it.

When M. Nélaton first saw the limb, and heard the history of the case, he was of the opinion that an amputation was requisite; after a few days had elapsed, however, everything seemed to be in a most favorable condition. It was very difficult, he said, to bring himself to practise an amputation; the unfortunate experience in his hospital, and, indeed, in many others in Paris, made him dread them.

A large gangrene, superficial and peripheric, took place; the integuments, mortified, were excised, the aponeurosis also; the muscles, mortified, were excised layer by layer, for a distance of nearly one inch. After that, the parts looked very well; the nutrition of the foot was perfectly good, and as sloughing had ceased, and the wound was covered with healthy granulations, the limb internally was known to be sound.

On the fourteenth day, the wound appeared to be doing admirably; it had greatly the appearance of a burn, of the third degree, in the process of cicatrization. Five days afterward, the man became anxious and prostrated, and the wound had a superficial layer of hospital gangrene upon it. It was washed with pure alcohol, and stimulants were administered; but the patient died in twenty-four hours.

The following case of necrosis of the tibia, is placed among fractures of the leg, as showing what may be one of the consequences of that injury.

March, 1853. A man, fifty-five years of age, who, eighteen years before, fell, in getting out of his cart, and the wheel passed over his leg. A compound fracture occurred; pieces of bone came out of the wound. He was taken to the Hospital St. Louis, and after remaining a long time, he went out with a deformed limb. In such cases, sometimes, the question of life or death overrules all other considerations; and, no doubt, this had been the case here.

In this patient, the astragalus was placed behind its normal situation, so that the man was unable to flex his foot. Toward the inferior extremity of the tibia, was a very voluminous mass of callus, rough and uneven, very near to the articulation. There were two fistulous openings, not deep, one on the inside of the bone, the other on the outside, in both of which naked bone could be felt. The articulation at the ankle was healthy, although the movements were limited.

It was difficult to decide, in this case, what to do. The fistula would not close so long as the denuded bone was there; and again, the bone, a cause of irritation, was dangerous; the articulation might be attacked by the extension of the disease to the small piece of healthy bone intervening. Besides, other abscesses would certainly form. The man was poor, and it was necessary for him to work in order to live. The dead pieces of bone were not loose; they were very large, and very near the joint; it would be a dangerous operation to remove all, and the surgeon could not be sure of accomplishing it.

The amputation of the limb was proposed to the man. It is a very serious operation, and the patient was past the adult age. If the patient had been rich, the advice would have been, to remain quiet, to take baths, to apply poultices, &c. &c.; but here, as soon as he left a hospital, the man would be obliged to work. Notwithstanding this, it was not thought proper to urge the operation upon the patient; it was proposed to him, and, when accepted, it was performed.

The man died in two weeks, of purulent affection.

November, 1851. A young man, twenty-eight years of age, who entered with a fracture of the fibula.

This fracture was diagnosed by a very sharp, local pain, at a point situated one and one-fifth inches above the extremity of the external malleolus, and by the lateral motion which could be given to the foot in the ankle-joint. This joint, like all the ginglymoid articulations, only admits, in its normal condition, of flexion and of extension; when one of the supports at the side is injured, a lateral movement can be made, which is perfectly impossible in the healthy joint. This sign is useful, precisely in the cases where other signs are wanting, or difficult to perceive, from swelling of the parts. In order to make this exploration, the foot should be held at its posterior portion, exactly at the articulation of the astragalus with the calcaneum; it is, above all, necessary to sustain the limb, and not to leave it to the patient, on account of the contraction of the muscles.

The fibula, although not placed, like the tibia, immediately beneath the skin, and, moreover, placed outside of the line in which the weight of the body is transmitted, is often broken, on account of the little resistance it offers to external violence; and, above all, in consequence of the important part its inferior extremity fulfils in the articulation of the foot with the leg. This articulation admitting only of flexion and extension, if abduction or adduction be attempted, or if the anterior part of the foot be turned forcibly inward or outward, the leg remaining fixed, these abnormal movements will tend to break the mortise; and the fibula, being the weaker bone, and, moreover, forming the long arm of the lever, for the external malleolus is longer than the internal, is the one generally broken. No matter in what direction the foot be turned, the arm of the lever is always, relatively, longer at the external malleolus.

In the movement of abduction, that is to say, of the turning of the foot outward, the foot resting on its inner side, the bone is broken in the following way: the calcaneum turned outward, its external face presses from below upward against the extremity of the external malleolus; the fibula, held fast, above, by the arrangement of its superior articulation, and below, by the ligaments uniting it to the tibia, is subjected to a pressure parallel to its axis, and yields where it is most feeble; that is to say, at the kind of neck above the malleolus. But, in order that this can take place, it is necessary either that the internal lateral ligament of the ankle-joint be torn, or that the internal malleolus be detached; for, without these previous lesions, the external face of the calcaneum cannot come in contact with the extremity of the external malleolus. This conclusion can therefore be made—that all fractures of the fibula produced by the simple movement of abduction must necessarily be accompanied by a rupture of the internal lateral ligaments, or by a fracture of the malleolus of the tibia.

In the movement of adduction, that is to say, of the turning of the foot inward, the foot resting on its external border, the astragalus, whose internal face is only supported by the malleolus of the tibia, in its upper third, tends to turn on its antero-posterior axis, and, consequently, to come out of the mortise offered by the two bones of the leg; its external face ceases to be in contact with the malleolus of the fibula. This malleolus, no longer supported in its inferior portion, while at the same time the external lateral ligaments exercise a powerful traction upon it, is broken at the level of the lower border of the tibia, which serves as a fulcrum to it. The manner in which this fracture is produced, justifies the name which has been given to it, of fracture *par arrachement* (by *tearing away*). The situation of the fracture is one and one-fifth inches above the point of the malleolus, and its direction is transverse. The fragments, slightly separated externally, are generally in contact by their internal portion; often, indeed, the diarthrodial cartilage, covering the inner side of the malleolus, has remained intact, and this could cause a belief of the existence of an incomplete fracture.

In the deviation of the anterior extremity of the foot inward, the motions of the different articulations of the foot are so combined, that they always lead to turning of the foot inward, to adduction, and with it, to the accidents already indicated.

In the deviation of the foot outward, the internal face of the astragalus presses, behind, upon the malleolus of the tibia, and its external face presses in front of the anterior border of the external malleolus, so as to fracture the fibula, if the effort be sufficiently violent. This fracture, known as fracture *by divulsion*, is always found two or two and a half inches above the point of the malleolus, being, as a general rule, so much higher, as the foot was more flexed at the moment of the deviation of its anterior extremity. The direction of the fracture is almost constantly downward and forward.

Another variety of fracture may be produced by this deviation outward of the foot; the ligaments uniting the inferior extremity of the fibula to the tibia, instead of resisting, as was supposed above, give way, the two bones separate, and the fracture is produced consecutively. But what is singular in this circumstance, is the fact, that the solution of continuity is situated, not at the inferior extremity of the fibula, but at its upper third.

In this case, the history of the accident, and the seat of the fracture, as shown by that very important sign, the local pain, showed the fracture to be one by adduction, or *par arrachement.*

As is usual in this variety of fracture, there was no displacement, and keeping the foot in its straight position was all that was required in the treatment. For this purpose, a dextrine bandage was applied to the limb. At the expiration of forty days, the patient left the wards cured.

The following case of sprain is interesting on account of the diagnosis, as not a fracture of the fibula.

December, 1852. A young girl, with signs of violence about the right ankle-joint. She had made a misstep, and twisted the foot. The question was, whether there was a sprain, or a fracture of the fibula. In the first place, there was no deformity, which renders the existence of a fracture evident, in some cases; here, there was only swelling. As regards ecchymosis, it existed on the dorsal surface of the foot, with two points more marked than others; one just below the external malleolus, the other above, along the course of the peroneal muscles. As regards local pain, there was nothing very characteristic; there was no one point where the pain was much more acute than at another. Another means of exploration, of great importance, above all when chloroform is administered to the patient, is the *ballottement* (*shaking* *about*) of the articulation. The fracture of the lower extremity of the fibula compromises the solidity of the joint, and there is lateral ballottement; the astragalus can be pushed from one side to the other. In order to detect it, the heel must be grasped as near to the articulation as possible, and then, if the muscles be relaxed, there will be ballottement, and even *clapottement* (*splashing*), in some cases. This is a most excellent sign of this fracture. Again, the malleolus of the tibia appears to become more projecting, when the heel is pressed to the opposite side.

In this case, there were none of these signs. As, perhaps, they were absent on account of the contraction of the muscles, chloroform was administered, but still they were not to be detected. There was, therefore, no longer any doubt; there was no fracture.

As to the ecchymosis in this case, it favored the idea of a sprain, being about the heel, below the articulation, where the ligaments are, and above it, along the peroneal muscles. To explain this last point, M. Bonnet, of Lyons, has noticed that when the fibres of the ligaments are torn, some of the fibres of these muscles are ruptured also.

February, 1853. A man with a fracture of the fibula; he was tipsy at the time of the injury, and did not know how it had occurred.. (It may seem out of place, but it is amusing to notice that, in French, they say a man is *gray* (*gris*), where in English they call him *blue*.)

The inferior part of the leg was swollen, so that the bony projections were concealed, and, at the same time, the foot was very slightly turned outward. Under the internal malleolus there was a slight depression. The ecchymosis was most marked under the external ankle. The space between the malleoli was enlarged. There were abnormal motions; the mortise of the joint was enlarged; one, at least, of the side supports was broken. By touching all along the fibula, invariably, just above the malleolus, a sharp and constant local pain was encountered; it was situated exactly at the favorite seat of fracture by abduction, or by divulsion. In examining the internal side of the limb, a fracture was found there also; the malleolus of the tibia had been torn off, fractured by arrachement.

There was also, as is seen in these cases of double fracture, a displacement of the foot. The foot falls backward, carrying with it the internal malleolus attached by the ligaments to the astragalus, and the lower part of the tibia makes a projection, showing itself in front. This displacement must not be neglected; M. Nélaton has seen patients, under these circumstances, get well, with a very troublesome deformity; they are unable to flex the foot on the leg.

In order to combat this displacement, a very strong splint, with a cushion upon it, was placed behind the leg. There is a very great inconvenience attached to the employment of this splint, for unless pressure upon the calcaneum be prevented, the pain it gives the patient is intolerable. To avoid this pressure, a series of pieces of agaric, all with a hole in the centre, were placed there, underneath the bone.

This patient went out on the forty-sixth day, cured, with no deformity; the bones were in perfect apposition.

November, 1852. A woman, from the country, entered the wards on account of an accident that had happened in the month of July, or more than four months before.

Walking in her yard, she made a misstep, and, in falling, her right leg was caught under her. The woman was very fat and heavy, and the violence, consequently, must be judged to have been great. Unable to walk afterward, she sent for a physician, who finding the limb greatly swollen, prescribed the application of a number of leeches. They were not applied; she remained in bed, and that was all she was willing to do for herself. After ten days had gone by, she sent for another physician, who limited his treatment to the application of emollient poultices. It was only at the expiration of fifteen days, that so much as a circular bandage was placed on the leg. From what the woman said, it seemed to have been only after some time, that the extreme deviation of the foot, that existed when she came to the hospital, was remarkable.

The affection under which this patient was laboring, was a luxation of the foot, according to some surgeons; a fracture of the fibula, according to others. It is, however, only a simple question of words; the affection is the same; a fracture of the fibula once made, the luxation of the foot is afterward added. The fracture had been one of abduction, or of divulsion, as M. Nélaton prefers to call it, and the displacement was extreme. In order that this fracture can take place, a rupture of the internal lateral ligament is necessary, and the astragalus had followed the external malleolus, so that its internal face was nearly one inch from the internal malleolus. The axis of the leg, prolonged beyond the lower extremity of the tibia, instead of falling upon the middle of the foot, fell upon its inner border. The whole foot had undergone a movement of rotation, the heel being carried inward, the point outward. There was a depression on the external side of the leg, about two inches above the extremity of the malleolus, indicating the seat of fracture in the fibula.

Sir Astley Cooper has noticed, many times, the tearing off of a portion of the tibia, about an inch in size, of the part next to the ankle-joint, where it is so firmly attached to the fibula. In this case, M. Nélaton supposed that it had taken place on account of the very great displacement that existed.

This patient was unable to walk. If tired of remaining in bed, she would attempt it; the integuments would be irritated and ulcerate; and it might happen, that even without walking, after a length of time, an opening would form upon the internal ankle. Beside the dangers resulting from this, the patient would suffer cruelly from the tearing of the ligaments. All this was sufficient to lead to the intervention of art for the relief of the deformity.

The reduction of the fragments, the seton, an angular resection, the rupture of the callus, the section of the bone, and the amputation of the limb, are employed in these cases.

As to the latter, amputations *par complaisance*, are very generally abandoned. When the plan of reducing the fragments is chosen, it can only be in cases where the callus is still soft. Dupuytren was the great partisan of this method. The time in which it can be done, is from the twentieth to the sixtieth day, at furthest; here, four months and nine days had elapsed, and, at that period, M. Nélaton despaired of being able to effect anything by simply stretching out the limb.

The seton is employed by some surgeons. By means of a perforating instrument, a hole is made in the callus, and a seton is introduced and left there. Inflammation is excited, the callus is softened, and, after that, the fragments can be brought into position. Here, the introduction of a seton was not applicable; a voluminous mass of callus did not exist.

The resection of an angular piece of bone could not be made in this case. Sometimes, from a deformed limb, a portion of bone can be taken from the convex side, and then, by fracturing the rest, it can be made straight; here, however, only the concavity of the fibula could be attacked.

The section of the bone would be very dangerous. If the section of the fibula were made, it would have to be complete, for the whole interosseous ligament being there, it would be impossible to drag away all that portion about the fracture. If the surgeon wished to get at the whole extent of the fracture by the section, he would penetrate into the joint, and the greatest dangers would result.

Rupture of the callus was the only thing left, and the question was, if this was practicable. As to the time that had elapsed since the receipt of the injury, facts seem to authorize the conclusion, that it may be attempted from six months to a year after the fracture in an adult, and even later in children. There is a fundamental distinction to be made in this operation, depending upon the situation of the fracture. Almost all fractures are in the diaphysis, and then the surgeon has two quite long levers by which he can act to produce the rupture. Here, the conditions were different; the fracture was very near to the articulation, and the lower fragment, at most, was but two inches in length. Again, the callus overcome, only the half of the task would be accomplished, for the astragalus was to be dragged into its place. There were some serious difficulties to be surmounted in performing the operation, but M. Nélaton thought it could be accomplished.

As to the resistance of the muscles, if the tendons were perceived to be too strong, the tendo-achillis would be divided. The tendons of the lateral peroneal muscles would be left, if possible, for they would aid in forcing the parts into place, as is readily understood from their situation.

There was a little uncertainty as to whether the surface of the tibia would be disposed to form callus alongside of the external malleolus, so as to reunite it to its old position when brought there.

The mechanism by which the operation would be performed was this: A strong splint, projecting beyond the heel, and having a screw attached near the lower extremity, was fixed firmly to the back part of the leg, which, of course, was protected by a cushion tha at the same time, raised the limb a short distance above the splint; a piece of gutta percha was moulded so as to cover the foot, at least, that portion of it against which traction would be made; bands were then attached to the foot, and fastened to the screw below.

As to the question, whether the rupture of the callus should be immediate or gradual, M. Nélaton did not hesitate a moment to prefer the instantaneous rupture. The soft parts could not sustain a pressure lasting for several days. When about to perform the operation, it was found that the patient had just commenced to see her monthly discharge, and it was therefore deferred for several days.

When the operation was performed, independently of the traction, a direct pressure was exerted upon the side of the foot. The foot was dragged down so that the sole of the foot no longer looked outwards, but the reduction of the astragalus was not effected. The condition of the patient was improved, insomuch that she was enabled to walk, after the consolidation of the parts.

November, 1853. A painter, forty years of age, engaged in working at the front of a house, on the third story, fell to the ground. What part struck the ground, no one had seen, but the nature of the injuries made M. Nélaton believe he had fallen on his feet. He lost consciousness for a short time.

When carried to the hospital, a wound was found on the nose, a solution of continuity, slight, and running towards the eye. The serious injuries, however, were in the feet, and they were different on the two sides.

On the left side, the foot was slightly deviated outward, that is to say, its plantar face, and there was considerable swelling at the ankle. Two circumstances, above all, fixed M. Nélaton's attention: the first, was a wound, not half an inch below the internal ankle, horizontal, nearly two inches in length, and clean, as if done by a sharp instrument; the second, was a deformity of the foot, the turning of the foot on its axis, and angular deviation;

beneath the external malleolus was a swelling, caused by the change in the position of the calcaneum.

The wound, alone, near the internal ankle, assured M. Nélaton that there was here a luxation of the foot; very probably, both a fracture of the fibula (by divulsion) and a tearing off of the lower extremity of the tibia. In removing the man's stocking, the foot resumed its normal position, showing how easily these luxations are reduced.

This kind of wound is exceedingly serious, giving rise to symptoms of acute arthritis, excessively violent. There was a wound communicating with the joint, and in the immense majority of cases this violent arthritis occurs. Again and again, M. Nélaton said, he had seen the amputation of the limb imperatively required.

This foot was kept in position by means of splints and bands, and a constant irrigation was kept up.

As to the other foot, the right one, there the lesion was one not so often met with; there was a luxation, but in the continuity of the foot, between the bones of the foot itself. When the man was first seen, the plantar face of the foot was much turned inward, in its whole extent. In seeking the cause of this, a projection was found in front, on the dorsum of the foot, easily recognized as the head of the astragalus, and the fingers felt beneath it a deep depression; on the internal face of the foot, something analogous was to be felt; the scaphoid bone was below, and internal to its normal position. The calcaneum was in the same position. It was plain that the astragalus had been luxated from the scaphoid bone and the calcaneum. There was, at the same time, a dark spot, from effused blood, in the soft parts covering the head of the astragalus.

When this injury of the right foot was exposed, M. Nélaton gave an unfavorable prognosis; for he feared a sloughing of the soft parts, and when the eschar fell, an opening of the articulations of the foot. Chloroform was given to the man, and the luxation was easily reduced; the foot, firmly grasped, was pushed outward, and, with the thumb, the astragalus was pressed into its place.

Everything in this case went on very well. In addition to the dangers proper to the injuries themselves, from being constantly, and necessarily, all the time upon his back, and always with fever, there was another cause of death, which should be mentioned, for many patients perish from it. Nothing is more common than to see eschars form, in such cases, upon the sacral region. The surgeon must not wait for them to form, but must endeavor at once to guard that region from the effect of the prolonged pressure, which is very easy to do, by means of a cushion, properly disposed.

This patient went out in the end of February, very nearly four months after his entrance, with stiff ankle-joints.

March, 1854. A man, whose right foot had slipped in walking on the rails of a railroad; the pain at the ankle was so great afterward, that he came to ask advice.

The right leg was deformed, the internal malleolus being more projecting than it ought to have been; moreover, the two malleoli were more widely apart there, than on the left side. When asked, however, the man said a similar accident had once before happened to him on the same foot, and, from what he said, there had very probably been, at that time, a fracture of the fibula, and one of the tibia also. These fractures had been badly consolidated, so that the mortise was wider than it ought to have been. This is seen quite often after fracture of the fibula.

The injury the man had experienced by the slipping of his foot, was the result of this want of correspondence between the astragalus and the mortise formed for it by the tibia and the fibula.

The man had received a sprain; had there been also another fracture of the fibula? Of this there was only one sign, but that was perfect, namely, the local pain. By following the bone with the finger, a point was found where the pain was exceedingly acute, and this point was, as usual, just at the base of the malleolus. By following the seat of greatest pain, the course of the fracture could be followed; its direction was oblique, running from below upward and outward. This was the only sign of fracture; there was no other. There was lateral movement of the astragalus, showing that the mortise was enlarged, but it could not be relied upon in this case, as there had been a previous fracture. In examining this movement of the astragalus, the heel must be seized in the palm of the hand, and the fingers should be curved, so as to seize the foot as much as possible with the ends of the fingers. It is not a movement of abduction and adduction; these take place below the astragalus; it is a movement of the whole bone from one side to the other.

The ecchymosis should be noticed; in sprains, it is said, the ligaments at the sides being lacerated, it is on the side of the heel below the articulation; in fracture it should be higher; here, there was an ecchymosis over the lower fourth of the fibula, over the malleolus, and below it.

The local pain here was so well limited, and so well placed, and the injury having been the result of the common cause of such fractures, the turning out of the foot, M. Nélaton was very sure of the diagnosis.

This patient would not believe that there was a fracture, and refused to remain in the hospital. He was told that very serious accidents might happen; arthritis, and serious injury to the functions of the joint.

M. Nélaton was of opinion, that consolidation of the fracture, with narrowing of the mortise, might have been obtained here; a dextrine-bandage would have been applied, and a few days afterwards, splints would have been so arranged as to press upon the malleoli.

March, 1852. A stoutly built young man, in a fall, injured the left ankle-joint, and was brought to the hospital. The displacement at that time was excessive.

The next morning, when M. Nélaton saw him for the first time, he found the limb very much swollen and very hard. The sole of the foot was turned very much outward; the internal malleolus was very projecting; when the limb was examined in profile, the lower extremity of the tibia was seen to make a great projection anteriorly.

In examining what lesions the bones had undergone, by pressure with the finger on the anterior face of the tibia, the continuity of the bone in its whole extent was ascertained, and there was no abnormal mobility. As regards the fibula, it was different; there, there had been a fracture by divulsion, by abduction of the foot; a point, corresponding to the base of the malleolus, was the most painful. This fracture, however, was not the only injury. Every fracture of the external malleolus, accompanied with great turning of the foot outward, has also a rupture of the ligament on the internal side of the joint; for even after the malleolus has been entirely taken away, there is no turning out of the foot without that. There was another complication, the displacement of the astragalus, which was placed behind its normal portion, leaving, as said before, the lower end of the tibia greatly projecting.

This was that fracture of the fibula, which requires a particular treatment; for if the astragalus be not carried forward to its normal position, the patient will not be able to flex his foot properly, and his walk will be restrained, for his steps will be very short. At first, leeches would be applied to the neighborhood of the joint, after them, poultices, and then the apparatus of Dupuytren.

Symptoms of extreme gravity developed themselves rapidly, in this case; symptoms of inflammation of the articulation, and of the subcutaneous cellular tissue of the leg, and afterward erysipelas, extending half way up the thigh. Four long incisions, interesting the skin and the subcutaneous cellular tissue, were made upon the leg, and one upon the foot. In the immense majority of these cases of diffused phlegmon, it is only the subcutaneous cellular tissue that is attacked, and it is not necessary to incise the aponeurosis in order to relieve the strangulation. When the incisions were made, no pus was found, but afterwards the cellular tissue presented a mortified appearance, and then suppuration commenced. By means of these incisions the phlegmon was arrested.

Arthritis, with suppuration, is very serious; the patient may die from purulent absorption, or be worn out by the discharge. The question was, whether it would be possible to diminish the dangers by practising the amputation of the limb? After such an operation, the patient would run great risks also, for almost all die after consecutive amputations of this kind.

M. Nélaton proposed the amputation of the limb two weeks after the receipt of the injury; it was performed just seven weeks after, the suppuration persisting in spite of all the means employed. Amputation, just above the malleoli, is a less serious operation than at the usual place of amputating in the leg; but here the tissues were changed, and, probably, the bone was inflamed; the operation, therefore, was practised at the favorite place.

Examining the pieces after the operation, the fracture was found to run from above downward, and from behind forward; it was, where it usually is in fracture by divulsion, just above the base of the malleolus. The fracture was perpendicular to the surface of the bone; sometimes it is lower down on the internal face of the fibula than on the external. This patient died of purulent absorption.

Pseudarthrosis of the Humerus.

April, 1852. A man, about forty years of age, entered the hospital, to undergo treatment for the consequences of a fracture received several years before.

The 24th of February, 1848, he was struck by a bullet in the superior and anterior portion of the humerus, at the apex of the triangle of the deltoid, at the union of the upper fourth with the lower three-fourths of the bone. He was carried to the hospital St. Louis, where the treatment was limited, at least so far as the position of the fragments of the fractured bone is concerned, to the application of two *unelastic* bands of extension and of counter-extension, one in the axilla, the other fastened to the wrist and attached to the head and foot of the bed. The difference between elastic and unelastic bands must be noticed, for if unelastic, their traction is illusory; a constant force is necessary to counterbalance the laxity which bandages will acquire. At all events, after waiting, in vain, five months for the consolidation of the fracture, the patient left the hospital with several fistulous openings at the upper part of the arm. Two years afterward, some small splinters of bone were extracted, and these fistulas closed.

This fracture, then, was not yet consolidated. There are numerous examples of pseudarthrosis as the consequence of fractures of the humerus. Mr. Norris, of America, who has published, on the subject of pseudarthrosis, one of the very best works that can be consulted, out of one hundred and fifty cases, which he has collected, gives forty-eight, or nearly one-third, of the humerus.[1]

M. Nélaton said he would pass over the discussion of the numerous causes that can lead to pseudarthrosis; in this instance, he attributed it to the fragments not having been kept properly in contact, by the apparatus applied after the receipt of the injury.

This fractured limb was one inch and three-fifths shorter than the other arm. The upper fragment was applied against the external surface of the lower, and it was not a simple juxtaposition, but the lower fragment had formed some bony stalactites, so as to make a gutter for the other. On this subject, however, of the condition of the fractured extremities, it is proper to be more precise. All cases of pseudarthrosis do not resemble each other; in some, there is a cartilaginous mass surrounding the fractured extremities; in others, there is an absence of any union, even fibrous; there is a muscular layer between the two fragments; in others, again, and these are the most common, there is a true fibrous ligament between them as between two vertebræ; and, in a fourth class, there is a true serous cavity between them. In all cases, the medullary cavity is found obliterated.

The first condition, evidently, did not exist here, for it only lasts for a few months, and here the affection was of four years' standing. It was not the second, for there was certainly some union between the parts. M. Nélaton believed it to be the third, which, as had already been said, is the most common; it was impossible, however, to be sure of this.

The inconveniences of the patient's condition were very great; he was unable to do any work. It was curious to see how he did, when forced to make use of the arm; it was necessary to have a fulcrum, to make the upper part of the lower fragment immovable, and to accomplish this, he pressed it against his chest.

A great number of means have been proposed for the purpose of curing false joints. Here, it was plain that the simple application of an apparatus to keep the parts at rest would not be sufficient. The ancient method, employed by Celsus, was to rub the fragments roughly, one against the other; but this is very little used, and it might be asked whether the cure would not have taken place just as well without it. The seton, passed at the seat of the fracture, is a method against which a great deal has been said. There is, however, no comparison to be made between the dangers of its employment in one limb, with those in another; in the femur, for instance, it is very dangerous. Here the conditions were simple, and it could be done very easily. In case it was found that the seton could not be passed between the fragments, it would be necessary to pass two of them, one on each side.

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[1] The Memoir of George W. Norris, M. D., on "The Occurrence of Non-union after Fractures," is to be found in the *American Journal of Medical Sciences*, for January, 1842.

The seton was passed, without difficulty, between the two extremities of the bone, at the seat of fracture. Desirous of exciting a good deal of inflammation, the next day a larger seton was drawn in, and the same thing was repeated the day after. A good deal of pain, and considerable inflammation, followed their introduction. The seton was allowed to remain for two weeks, and being then withdrawn, the arm was placed in an apparatus to keep it perfectly at rest.

The man did not remain a sufficient time in the wards to complete his cure there; but I have been assured that the parts became perfectly consolidated.

Formation of Callus.

A great many hypotheses have been made, to explain the mode by which the fractured extremities of bones are united, but only hypotheses, as is easily understood, for it is by cicatrization, by regeneration, and to know this well, the generation of bone must be known. Cicatrization is the reproduction, in the adult, of phenomena that have taken place in the fœtus; to know it, embryogeny must be known; to know how a bone cicatrizes, osteogeny must be understood. As, until very recently, osteogeny was unknown, what has been given almost everywhere in explanation of the formation of callus, is, indeed, but hypothesis. It will be necessary, therefore, previously to describing the process by which callus is formed, and this can then be done in a very few words, to explain the formation of osseous tissue.

The anatomical element of bone, the substance itself, of which the osseous tissue is composed, is characterized by a homogeneous amorphous matter, called *fundamental substance*, limiting, or, it may be said, hollowed out, by small cavities, from the periphery of which proceed ramified canaliculi. These cavities have been called by M. Serres *osteoplastes*, from a Greek word signifying *bone* and *former;* they have sometimes been called *bone-cells*, although they have no analogy with the anatomical elements called *cells*. These same cavities have been called *corpuscles; black, ramified*, and *calcareous corpuscles*. The cavities, and the ramifications leading from them, do not contain any calcareous carbonates, as was formerly supposed; they are *cavities*, and not *corpuscles*. These cavities are only visible under the microscope, and from being filled with air, in the dry bone, they have a black tint.

It is very easy thus to recognize bone, for these cavities are very characteristic. Every very hard production, with these cavities, will be known to be bone; every concretion without them is not. This is insisted upon, for what are called ossifications in the coats of arteries, or in fibrous tumors of the uterus, are in reality not bone at all. No bone has ever been found developed, unless when there was osseous tissue in juxtaposition, except in the permanent cartilages, as of the larynx, or of the ribs. It is an important fact, also, that wherever these osteoplastes are found, the same proportion of phosphate of lime and of gelatine is always found in the substance containing them. Some authors maintain, that the bones of the fœtus do not contain the same proportions as those of the adult, but if the same quantity of bone, *by weight*, be taken from each, the quantity of calcareous matters will be found to be the same.

These cavities have around them canaliculi, which, by very fine ramifications, communicate with the ramifications of the canaliculi of osteoplastes in the neighborhood. The length of these cavities is 0.020 millimetre to 0.025 millimetre, or $\frac{1}{1000}$ inch, and the breadth about one-half of that; they can be sometimes almost round, but they always have the canaliculi ramifying from the periphery. It is said that, in newly-formed bone, and in the ossifications found in cartilages, the osteoplastes have a form somewhat irregular; if this be true, some disputed points in surgery could be settled, as, for instance, whether in fracture of the lower extremity of the radius, one extremity is really driven into the other, or only apparently, from the formation of superposed new bone.

The *osseous tissue* is composed of the fundamental substance, containing the osteoplastes and their ramifications, placed in layers around what are called the Haversian canals, which are but ramifications of the canal containing the bloodvessels that supply the bone. The entire osseous substance, therefore, is penetrated by a connected system of canals and canaliculi, by means of which the nutritive juice secreted by the vessels is conveyed into its densest tissue. In the compact tissue, the canals are separated from each other from 0.10 millimetre to 0.20 millimetre, or $\frac{1}{250}$ to $\frac{1}{125}$ inch. In the spongy tissue, the areolæ of which are full of marrow,[1] as is well known, when the laminæ are but $\frac{1}{250}$ of an inch in thickness, they contain no canal; nutrition in them takes place by imbibition. Each canal contains an artery with its accompanying vein, and some marrow; the reason of the great hardness of the petrous portion of the temporal bone, and of some accidental osseous formations, is, that they contain very few Haversian canals.

The mode in which this osseous substance, and the tissue that it composes, are produced, will now be described.

The phenomena of the generation and of the development of *the osseous substance with its osteoplastes*, or of the *anatomical element of bone*, are the same everywhere, whether there be, or not, masses of granulations or cells in the cavities contained in the fundamental substance of the cartilage,[2] *which always precedes it.* An opaque granular deposit is formed in the fundamental substance of the cartilage; in the portions of this substance separated from each other by the cavities. By the aid of hydrochloric acid, this deposit can be recognized to be phosphate and carbonate of lime, and it takes place before the appearance of any bloodvessels. This granular deposit becomes, by degrees, more and more homogeneous. As the deposit increases, the cavities become more narrow, and, at the same time, the granulations, or the cells which may be contained therein, become gradually atrophied, and at last entirely disappear; to be replaced by the clear liquid which fills the osteoplaste. About this time, at the periphery of the cavities (now become cavities of the osseous substance), dark fissures, generally simple, sometimes bifurcated at their extremities, are seen to appear. These are the ramifications of the osteoplastes, commencing to make their appearance. In proportion as the cavity becomes narrow, the length and also the breadth of these canaliculi augment, and their small flexuosities and ramifications multiply. This increase in the length of the canal is caused, evidently, both by the diminution of the cavity, and by the absorption of osseous substance at the extremity of the canaliculus. This absorption is demonstrated by the following fact: these small canals, when they first appear, are never anastomosed, and, generally, they are simple; as soon as the osteoplast is fully developed, and no longer becoming narrower, they are, almost all, subdivided, and many of them are anastomosed at their extremities with similar canaliculi. It is not rare, also, to see a partition project from the sides of the cavity, so as to divide it into two or three smaller cavities; in this way, from a single cartilaginous cavity, two or three osteoplastes may be formed.

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[1] See page 80, Marrow, under Cancer.

[2] See Enchondroma.

The generation and the development of the osseous substance with its osteoplastes, or of the *anatomical element of bone*, always take place as has just been described; the generation of the *osseous tissue*, however, takes place in two modes, which it is necessary to understand; in one, there is generation *by substitution*, in the other, *by invasion*.[1] Bone is always preceded by cartilage, either presenting the form of the organ to be formed, in which case there is ossification by substitution, or the cartilage is developed as the bone is to be produced, in which case there is ossification by invasion.

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[1] Kölliker makes a distinction of the bones into *primary* and *secondary*, upon the ground of their development, or non-development, from cartilage. Secondary bones are those in which ossification takes place by what is called above, *invasion*. The formation of the osseous substance takes place in both, in the same way, and the question is, merely, whether the tissue from which the secondary bone proceeds, called by Robin *cartilage of invasion*, is really cartilage or not. "A tissue which is identical with the embryonic form of cartilage, which passes into adult cartilage, and differs from cartilage only in the absence of chondrin (in which respect ossified cartilage agrees with it)—is, in a morphological point of view, homologous with cartilage." (See the note of the translators to the American edition of Kölliker's *Manual of Human Microscopical Anatomy*, page 336.)

All the bones of the trunk, and those at the base of the cranium, are preceded by cartilages having the same form; in the centre of this cartilaginous tissue, the bony substance develops itself, as has already been described; it *substitutes* itself for the other, which disappears; it replaces it. After all the pre-existing cartilage has become bone, and the perichondrium, periosteum, these bones grow *by invasion.*

The mode of generation by invasion, belongs to the greater number of the bones of the head, as well for their primitive formation, as for their consecutive increase in size. It occurs, in fact, in the parietal bones, the frontal, the occipital, with the exception of the condyles and the basilar process; the squamous portion of the temporal bone and the zygomatic apophysis, the ring of the tympanum, the smaller wings of the sphenoid bone, the thin portion of the greater, the ethmoid, the turbinated bones of the nose, and the vertical branch of the lower maxillary. In these bones, as soon as the cartilage appears in the fibrous tissue, as a very small point, the osseous substance immediately appears in its centre, and it continues to invade, little by little, the place which the bone must occupy; but the cartilage does not commence by occupying all this place, as in the other bones; it invades it gradually, and in proportion to the phosphatic deposit. The breadth of the layer of cartilage is never more than one quarter of a millimetre, or the one-hundredth of an inch. Here then the bone grows as it had been formed, by the same mode of generation. The other bones, commencing by substitution of the osseous matter in place of cartilage, grow by invasion, by a mode of generation somewhat different.

The commencement of the earthy deposit in the cartilage, is not, in the embryo, preceded by the formation of bloodvessels; it is only consecutively that they are formed. In the fœtus at *term*, and in children, there are many bloodvessels formed in the cartilages about to be ossified, but it must not be thought that, during the whole of uterine life, vessels ramify in the cartilages before the formation of the bony substance, which would only follow these vessels. It is only when the bones and the cartilages have reached a certain size, that capillaries are developed in the whole of the cartilage to be ossified; in the embryo, until about the third month, the vessels are only found in the osseous substance already formed, and the cartilage, into which it is advancing, is without them. The vessels advance at the same time with the earthy deposit, but without preceding it.

As the bone increases in size, the vessels multiply their ramifications, and the osseous substance, at first quite compact, homogeneous as the cartilage whose place it has taken, can be observed to be gradually hollowed out, to be absorbed, so that the cavities and canals, which have already been spoken of, incessantly increase in size. In proportion as the bone increases in size at the periphery, by invasion, it hollows itself out at the centre. These cavities are larger than the lamellæ of osseous substance which separate them: and this condition of things increases, until it becomes that found in the *spongy tissue*, as it is called, of adults. That portion of the bone which is to be occupied by the medullary canal, after being in this condition for some time, at last is completely absorbed, and this canal is formed; it is not formed by the union of two demi-canals, as has been asserted.

The absorption of the compact substance primitively formed, from which the cavities of the spongy tissue result, never reaches the surface of the bone; a layer of compact substance always remains. This layer tends to become thicker by the generation of osseous substance by invasion, or, as some authors say, by the formation of periosteal layers, while the absorption towards the internal surface keeps it at about the same thickness; in the long bones, however, the thickness increases somewhat with age. This layer of compact tissue is less dense in young subjects, because the vascular canals are larger than in adults. Osteitis causes, sometimes, more or less rarefaction of this compact tissue; by bringing about increase of size in the vessels, and increase of diameter of the vascular canals, in proportion to the vascular dilatation. The increase in length of the long bones takes place at their extremities; the middle portion does not assist at all; it only ceases when the epiphyses are united to the body of the bone. In old persons, the internal absorption continues after the increase in thickness has ceased; extreme thickness of the walls of the medullary cavity results, which explains the great fragility of the bones at that time of life.

The formation of the bone being understood, and the fundamental phenomena of its nutrition, it will be easy to understand the formation of callus, or the phenomena observed in the union of fractures.

The phenomena are accomplished more or less rapidly according to the position of the fragments; when they ride over each other, the phenomena last a longer time than when placed end to end, as is supposed to be the case in the following description: After the fracture, the first thing is an effusion of blood between the ends of the bone, and its infiltration into the tissues in the neighborhood. This blood remains until the second or third day, when it is absorbed with some rapidity; its absorption commences, at first, at the circumference, and takes place not only externally to the bone, but also between the ends, and in the marrow. As it is absorbed, a semi-transparent, reddish, fibroid matter, generally striated, and containing fatty granulations, is seen to be deposited. This red, elastic, striated substance is also found at the fractured extremities, extending some distance towards the articular extremities, between the periosteum and the bone. It is found, perfectly distinct, after the third day, and until the eighth or tenth day after the fracture.

After the eighth or tenth day, a bluish matter is seen to be produced, at first, in the medullary canal, that takes the place of the other; this matter is cartilage, and presents all its characters. It obliterates the medullary canal, is interposed between the two ends of the bones, extends quite far under the periosteum, and may go further beyond the bone, even three or four inches. What is called *provisional callus*—*callus* means *a hard mass*—is, in part, this mass, and, in part, the engorgement of the parts around. After a fracture, then, there is an accidental phenomenon, the effusion of blood; the first phenomenon of regeneration is the production of the fibroid matter, and the second is the production of cartilage, taking its place, determining the absorption of the fibroid matter, and substituting itself for it. The cartilage found, is never formed by softening of the extremities of the bones; osseous tissue, no more than any other, can be transformed into another. *When one tissue takes the place of another, it is by substitution, never by transformation.*

This cartilaginous mass contains, generally, the four varieties of cartilage; thus, for instance, on the external portion the first variety is always found, and also in the part between the periosteum and the bone, and on the surface of the cartilaginous mass filling the medullary canal. Underneath the surface, between the broken ends themselves, the second and third varieties are found; and, in some points, a fibro-cartilaginous appearance will be seen.

In this cartilaginous mass, without any particular corresponding vascularity, osseous points of a reddish, starred appearance, are seen; they make their appearance, at the soonest, on the seventh day after the formation of the cartilage, and extend further and further, taking the place of the cartilage. This deposit of bone is produced just as in the fœtus, hence it will not be necessary to go into any details; when the cartilage is of the first variety, the bone is generated by invasion; when of the others, by substitution. Whenever there is ossification by invasion, the phenomena of ossification are not perfectly limited, and therefore in the formation of the bony callus, the surface of the cartilaginous mass being composed of cartilage of the first variety, the production of bone can continue for some time.[1]

These thin cartilaginous layers, invading the neighboring tissues, or the place occupied by the liquids effused after the fracture, continue to be formed on the surface of those that are gradually ossified, and give it an irregular aspect; sometimes, they even produce, on the surface of the callus, prolongations or osseous stalactites.

These irregularities are finally absorbed, and the parts tend, more and more, to return to the normal form of the bone. The callus diminishes inside as well as outside, and at last the medullary canal is re-established.

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[1] In comminuted and compound fractures, particularly, this is seen, and it must not be thought that the irregularities in the bone have been preceded by irregularities in the cartilaginous mass; they have been formed by invasion, in the manner before described. It is by invasion that the stalactites are produced in Pott's disease, and also where some tumors are formed in the neighborhood of bones. The presence of the tumor has a similar effect to that of an ulceration near a fracture: it deranges the vascularization, upon which all the phenomena must depend. The state of the circulation causing the production of irregular *layers of growth*, enables the surgeon to account for many things; differences in height, changes in the face, the disease called rickets, are all owing to irregularities in the cartilages of invasion. In the poor quarters of London and large European cities, the bad air and bad nourishment, by their influence upon the vascularization, affect these cartilages to such a degree, that the face often resembles that of the monkey, as much as of the man; it is a true pathological anomaly.

It is seen, therefore, by what precedes, that the formation of callus is a true cicatrization of the osseous tissue, representing, in its mode of reproduction, the production of bone in the embryo.

CHAPTER VII.

LUXATIONS, WITH SOME PARALYTIC AFFECTIONS.

Luxations.

THESE are very rarely seen in the hospital in which M. Nélaton has his wards. Situated in the Latin Quarter of Paris, there are very few mechanics or laborers, among whom such accidents generally occur, in its neighborhood. In fact, with the exception of the cases in which the foot was luxated in fractures of the malleoli, a luxation of the shoulder, and one of the clavicle, are the only cases of luxation, from external violence, brought there during my stay in Paris.

It has been found convenient to introduce, in this place, some cases of paralysis.

February, 1854. A young woman, with a luxation of the shoulder, of two days' standing, was brought to the hospital, after several efforts had been made to effect its reduction at home. The surgeon sent her, in order that more powerful apparatus than he could command, might be used.

The bone had been forced out of place, in a fall from a chair; the patient could not explain how it occurred, but was sure that she had not struck her shoulder. The signs of luxation were most evident. The body was inclined towards the side of the dislocation; the arm did not fall well alongside of the body; it was in a condition of *slight* abduction, but *permanent*, and only overcome by making her suffer great pain; the shoulder was flattened, but the patient was very fat, and the flattening was not so well marked as it is in thinner persons.

The depression under the clavicle, where the deltoid and pectoral muscles join, existed. When the deltoid muscle was relaxed—to cause this the elbow is carried outwards—a depression could be felt, and the fingers passed under the acromion process, and brought near to the glenoid cavity. This is a sign never to be neglected, for the fracture of the clavicle near to its external extremity can simulate a luxation; but, relaxing the deltoid, in such cases the acromion cannot be felt occupying its normal position. In the axilla, when the arm was somewhat abducted, the smooth round head of the humerus could be felt.

The dislocation was one of the sub-coracoid variety; the head of the humerus was in front of the coracoid process; it was not the intra-coracoid variety, in which it is felt in the subclavicular depression. In this case, the coracoid process could be felt, upon the highest part of the head of the bone. In the sub-glenoidian variety, the humerus is very far down, and the head is felt very low down in the axilla.

As to the measurements between the two sides, none were made; the woman was so fat, it would have been impossible to make them with correctness.

The reduction of this luxation, M. Nélaton said, would take place without much difficulty; he had often reduced them by putting the pulp of his fingers on the head, and then by a simple movement of flexion, placed the head in the glenoid cavity, by simple impulsion.

The left shoulder was the one out of place. The woman being seated, M. Nélaton, without asking any assistance, pushed against the internal parts of the head of the bone with the ends of the fingers of his left hand, while, with his right hand, he carried the elbow toward the patient's body. The head of the humerus slipped into its place almost instantaneously.

The condition of the right shoulder was examined at the autopsy made in the case of the patient who died of purulent absorption after an operation for cancer of the tongue, performed in November, 1853. There had been signs of an ancient luxation, which the man said had happened twelve years before, and for which nothing had ever been done. The glenoid cavity was found empty, and the head of the humerus was situated alongside, internally; the luxation was sub-coracoid, and to some degree intra-coracoid. There were all the signs of a cavity, of new formation, for the reception of the head of the bone, and all the signs of a false joint; but it had been affected, as well as several other joints, by the disease of which the patient died, and was found inflamed and full of pus.

To understand the situation of the joint, it is necessary to understand the different varieties of luxation of the humerus. M. Nélaton makes four, one postero-external, and three antero-internal. When postero-external, it is under the spine of the scapula, and there is no difference of opinion among authors in regard to it. When antero-internal, it can occupy different positions; one, now admitted, formerly denied, by Malgaigne, is directly under the glenoid cavity; another is under the coracoid process, in front of the glenoid cavity; and a third is internal to the coracoid process, *intra-coracoid*, which some authors, as Velpeau, call sub-clavicular.

The sub-glenoid variety was called by Dessault, a luxation downwards, and as he did not find it often at autopsies, he said that the head of the bone went up before the glenoid cavity, and continuing to ascend, he said that it could go up so as to become a luxation upward. Since the works of Malgaigne, these varieties are diagnosticated at first, and the surgeon is not obliged, in order to explain the situation of the bone, to have recourse to these transformations.

M. Nélaton gives the following table of the signs of the four varieties of luxations of the shoulder.

SUB-GLENOID.	SUB-CORACOID.	INTRA-CORACOID.	SUB-SPINAL.
Considerable flattening, and tension of the deltoid.	Flattening of the deltoid, principally behind.	Flattening of the deltoid not well marked, and only behind.	Deformity at the shoulder not very marked.
Very marked projection of the acromion.	Less marked projection of the acromion.	Slight projection of the anterior portion of the acromion.	Anterior part of the shoulder depressible rather than flattened.
Preservation of the hollow place under the clavicle.	Diminution of the subclavicular depression.	Subclavicular depression replaced by a projection, due to the presence of the head of the humerus.	
Head of the humerus in the axilla and subcutaneous.	Head of the humerus more elevated, less accessible to the touch.	Head of the humerus very elevated, raising up the anterior wall of the axilla, and inaccessible to the touch, in the axilla.	Head of the humerus forming a tumor slightly marked under the acromion.
Lengthening of the limb.	Arm generally longer, sometimes shorter, or of its normal length.	Arm shortened.	Arm lengthened.
Augmentation in height of the anterior wall of the axilla.	Augmentation in height of the anterior wall of the axilla, slightly pushed forward.		
Elbow very far from the body.	Elbow not so far from the body.	Elbow nearer the body, and carried backward.	Elbow nearer the body, and carried forward.
Active movements impossible; passive, not painful, except adduction.	Active movements impossible; passive possible, but painful.	Movements, active and passive, impossible.	Movements, backward and outward, impossible.
	Crepitation quite frequent.	Crepitation rare.	

Paralysis of the Muscles of the Arm (from a fall on the shoulder).

April, 1853. A man, about forty years of age, entered the hospital with a partial paralysis of the muscles of the arm and forearm. This affection had originated in an accident, which quite often determines the luxation of the humerus, though here it had not. Two months before, he had received a fall upon the shoulder, and since then the arm had been powerless.

The patient was examined and cross-examined in every way, in order to know if there had not been a luxation, easily reduced. There *had been none*, however; he had fallen, and afterwards the limb was inactive, that was all. He entered a hospital where blisters were applied about the shoulder; his condition was not improved, and he came into M. Nélaton's wards.

The arm rested, hanging at the side of the body; the humerus was at a distance from the acromion, no longer being sustained by the muscles. The deltoid was completely flaccid, inert; there was not the slightest fibrillary *frémissement* in the muscle. The same was true of the biceps, and also, there was every reason to believe, of the brachialis anticus, and coraco-brachialis. The supra-spinatus, the infra-spinatus, the serratus magnus, and the supinator longus were in the same condition. The other muscles, the triceps, the radial, and the ulnar, had preserved their function. There was no sign of general paralysis, nor any symptom to indicate an affection about the cervical vertebræ. This paralysis, following a fall upon the shoulder, has long, indeed it could be said always, excited the attention of surgeons. The circumflex nerve, as is well known, supplies the deltoid, and this muscle is the one usually paralyzed, and hence this nerve was supposed to be lacerated by an accident, in which the head of the humerus is forced from the scapula. In this case, a nervous lesion, much more extensive than that, was necessary to have produced paralysis of so many muscles; and, moreover, what is the principal fact, there had been no luxation. Again, this paralysis could be imagined after a fracture, from injury inflicted by one of the bony fragments; here there had been neither fracture nor luxation. No such case can be found in medical works.

In the *Surgical Anatomy* of M. Malgaigne, it will be found that he expresses some *doubts* as to the correctness of the generally received opinion, as to the cause of this paralysis, and that is a great deal for him, so well known as most positive in his opinions.

In order to resolve the question, we have some elements to assist us. Paralysis of the face in a child has been seen to result from the application of the forceps; and in some cases a paralysis of the arm of the same side. In the autopsies made, it was very plain that these paralyses were owing to contusion of the nerves. Could not the brachial plexus be contused by something else than the head of the humerus? It can very readily be compressed, M. Nélaton thinks, by the clavicle being pushed against the first rib, as by a fall upon the shoulder, by which the clavicle is carried inward and backward. And, what it is important to notice, the axillary or the circumflex nerve is found at the points the most exposed to pressure. By making a dissection of the parts, or even by glancing at a well-executed plate representing them, you can easily satisfy yourself of this. Again, *the paralysis* is only of the *motion* of the limb; *sensation* is uninjured.

What prognosis can be given in a case like this? Experience shows, that sometimes these paralyses persist in spite of everything. Here, not the slightest change for the better had taken place in two months. All the muscles mentioned above, were completely refractory to electricity. It was indicated here, to apply near the origin of the brachial plexus some lines of cauterization, by the actual cautery; strychnia would also be used by the endermic method, and so soon as there should be the slightest sign of muscular contraction, electricity would be employed.

Congenital luxation of the shoulder, according to M. Nélaton, is congenital paralysis; the muscles being inactive, the bone is only sustained by inactive bands; and at last, from elongation of the ligaments, luxation takes place.

This patient received no benefit from the cauterizations, or from any of the local applications made use of. In the month of June, the use of electricity was commenced by M. Duchenne, and continued until, at least, the middle of the month of August. At that time there was no change whatever in the arm, except that the muscles were smaller.

It was, then, M. Nélaton's opinion that the arm would always remain in that condition.

Paralysis of Muscles of the Thigh.—(Progressive Muscular Atrophy.)

February, 1852. A man, about forty years of age, a chimney-sweep by profession. For many years he had exercised that part of the business in which they are compelled to ascend chimneys; in doing so, as is well known, the lower limbs are used. For the last few years he had given that up.

His affection commenced by his experiencing pains in the lower extremity on the right side; he said also that he had, at the same time, a sensation of coldness in the same limb, principally in the thigh, and frequently it was attacked with cramps. In these cases, there is a fibrillary contraction, a *frémissement* of the muscles, and when the man was asked, he said he had noticed a *trembling* of the muscles there. The limb was becoming gradually more and more feeble.

The lower extremity of the right side, and principally the thigh, when compared with that of the left, was seen to have considerably diminished in volume. When it was compared with the superior portion of the body, the shoulders, &c., the diminution was much more striking; these were very powerful. The patient was short and thick (*trappu*).

As to the motions of the limb, some were entirely lost. The patient, when lying on his back, succeeded in raising the thigh, but it was by a peculiar artifice; it was not by the contraction of the anterior muscles, the extensors, but by flexing his knee, and then the heel being prevented by the bed from going back, of course the knee was pushed upwards. It was impossible for the patient to elevate the heel from the bed.

Here, then, was a sensation of coldness, cramps, fibrillary contraction, and wasting of the limbs; the tableau is complete. The affection was plainly what has been recently known to the profession as progressive muscular atrophy, or progressive muscular paralysis. It is only within a very few years that physicians have begun to recognize this affection.

In this disease, there is no alteration of the nervous centre, but one limited to the nervous ramifications. In this case, there was paralysis of the upper part of the limb, while the muscles of the leg preserved their contractility. There is another opinion, which attributes the affection to alterations in the muscular fibres themselves. But, all the symptoms attending the commencement of the affection, are those of a nervous lesion; pain, cramps, and a feeling of coldness. The atrophy of the muscles is a consequence of their paralysis, and it is produced slowly; in cases where the muscles are primitively affected, it is produced rapidly. M. Nélaton said that he must agree with M. Cruveilhier, in his opinion, that the disease is a nervous affection, which commences in the nervous ramifications.

It has been remarked that, as the disease progresses, it is the homologous muscles that are successively attacked. As a general rule, it commences near the terminal muscles of the limb, as, for instance, those of the thenar eminence; after them, those of the other hand are attacked; then the interosseous, and so on in succession. The hands, when thus affected, take the form of cláws.

Only one application has been of any service in this affection, and that is galvanism; and this, also, in the greater number of cases, has proved ineffectual.

This patient only remained sufficiently long in the wards to be examined by the class, which was the object with which M. Nélaton had admitted him, and then he went out.

In a very long memoir by M. Aran, published in the *Archives Générales de Médecine*, for the year 1850, will be found a good deal that is interesting on the subject of this curious affection. The opinion, to which the author is led by the consideration of the eleven cases therein reported, as to the nature of the affection, differs from that of M. Nélaton, as given in the preceding case.

The author says: "I conclude, then, and I maintain, that progressive muscular atrophy cannot be localized elsewhere than in the muscular system, in the tissue itself of the muscles interested in the disease. In what then consists this morbid action? This it is impossible for us to say, without producing hypotheses, which have no solid basis to support them; nevertheless, I would be tempted to believe that before reaching the state of fatty transformation, the muscular system is the seat of an excessive irritability, that does not permit it to preserve the nervous influence constantly reaching it. It is in this way that can be explained, it appears to me, the cramps, the twitchings of the tendons, and above all the fibrillary contractions, these nervous discharges so common in this affection." In the *Archives* for March, 1853, there is a memoir by Cruveilhier on this subject. He believes the primitive lesion to be atrophy of the anterior roots of the spinal nerves.

According to M. Robin, the alteration is characterized by a pale rosy yellow tint of the muscles, with a diminution of one-half to nine-tenths of their striated fasciculi. They become, at the same time, granular, and the greater number of the granulations are grayish, some fatty; then many of the fasciculi disappear completely. To this atrophy does not succeed the replacing of the fasciculi by series of adipose vesicles, as does occur in cases of paralysis of the motor nerves, with *fatty substitution* of the muscles. This last disease has been erroneously confounded with progressive muscular atrophy, which is a different affection. This does not take place after a lesion of the motor nerves, as the other; it has for its cause the repeated action, too long continued, without sufficient intervals of repose of the nervous centres, or of the muscles which become atrophied, either in a portion of the body, or everywhere. The functions of the nervous centres remain intact until the death of the patient. The result of the examination of the nervous tubes is in accordance with the preservation of voluntary contraction until the last stages of the disease; they are found to remain intact. What are called *fatty granulations* in muscles, in the descriptions given of their appearance when affected by progressive atrophy, have certainly been considered by Cruveilhier to mean *adipose vesicles.*

In cases of *fatty* or *adipose substitution* of the muscles, the *fatty transformation* of authors, there is preceding atrophy of the striated muscular fasciculus, and its replacement by *adipose vesicles,* that are produced in their place. Just in proportion as the fasciculi disappear, the series of adipose vesicles take their place, and thus substitute themselves for the muscular elements.

There is another kind of atrophy of the muscular fasciculi, that is very remarkable, and which has also received a great deal of attention, from its connection with the deformity known as club-foot. This is called *fibrous transformation.* The name is a bad one, for there is no fibrous tissue whatever formed; and, moreover, there is no such thing as a transformation of tissue under any circumstances. In this affection, neither the cellular tissue nor the adipose vesicles, normally interposed between the fasciculi, augment in quantity. The muscular fasciculi diminish in breadth, so as to be but 0.008 millimetre, to 0.010 millimetre, (or $\frac{1}{2500}$ inch) instead of 0.055 millimetre, or 0.100 millimetre; and the muscular elements diminish also in length, causing thus forced flexion of the articulations, and retraction of the limbs. When the striæ have completely disappeared, the cavity of the sarcolemma[1] is full of an amorphous matter (in place of a striated), finely granular; but the granulations are few, very small, and never fatty.

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[1] The *sarcolemma* performs a certain physiological part that is seldom noticed. Without this elastic tubular envelop of the contractile muscular fibrilla, a muscle,

In saying *fatty substitution* of one anatomical element for another, in place of saying *transformation* of one element into one of a different kind, there is not, as some persons suppose, a mere question of words. It is, on the contrary, a question of fact. There is the fact of the disappearance, molecule by molecule, of one anatomical element, with its replacement by another; a new body that remains is deposited in the place of a body that goes away. In saying *substitution*, the reality is correctly expressed, in place of being designated by a false term; false, inasmuch as it involves the idea of a passage of one form to another, when there is replacement, molecule by molecule, of one kind of body by another kind of a different elementary nature. The word *transformation* gives the idea of a simple change of form or of color, in a body whose molecules remain the same, or change their nature on the spot, whilst they are in reality carried away in order to be replaced by others. (See Nysten's *Dictionary of Medicine*, 10th edition, p. 1191.)

Paralysis, after Asphyxia by Charcoal.

January, 1854. A man, about thirty years of age, who had been interrupted while attempting to commit suicide by means of burning charcoal, was brought to the hospital, still in a kind of stupor. This man presented a paralysis, caused by the fumes of the charcoal; for it was evident, from the condition of his hands, that he had been working but a day or two before. The right arm and the right leg were completely deprived of the power of motion; when first brought to the hospital, they appeared to have feeling, but the following day there was none. On the second day, moreover, the paralysis had extended upward so as to affect one-half of the face.

This patient was immediately bled, and a purgative of the tincture of jalap was administered; the second day, the same

when contracted, would remain in that position, unless another muscle pulled it into place. Many authors have confounded elasticity with contractility. In a tissue one element is fundamental, while another is accessory; in the muscular, the striated fibre is fundamental, the elastic sarcolemma is accessory.

treatment was repeated. The patient remained a short time in the wards, and left in the condition he was in on the second day. M. Nélaton said he had always seen the paralysis consecutive to asphyxia from charcoal to persist.

Luxation of the Clavicle.

June, 1852. A man entered the hospital after having received a fall upon the shoulder. It appeared, also, from his account, that at the same time the trunk of the body had been thrown forwards.

The attitude of the patient was about the same as that seen in fractures of the clavicle. The motions of the arm were painful.

By placing the hand upon the shoulder, a luxation of the external extremity of the clavicle, upward and backward, was at once detected. On the top of the shoulder, a small, hard, rounded tumor existed, continuous with the clavicle, of which one could easily assure himself, by following with the finger the anterior face of the bone. This tumor was reduced by elevating the arm, and returned immediately after it was allowed to fall. There is always, in a normal condition, a slight projection at the extremity of the clavicle; but, here, it was much greater than usual.

Cases of this kind, M. Nélaton said, often were seen in the hospitals.

The reduction of the luxation is easily effected; it is sufficient to combine depression of the clavicle with elevation of the arm; but it is impossible to keep it so. For this purpose, M. Malgaigne has proposed the tourniquet of Petit, applying the instrument on the clavicle, while the strap passes under the elbow; the forearm being flexed at a right angle, and covered with a starch-bandage. It is impossible, however, for the patient to support this apparatus; it produces ulceration at the shoulder and the elbow, the two points on which the pressure is exerted. M. Nélaton said he had seen M. Mayor completely fail with his bandage, in a case which he had given him in his own wards.

As the surgeon cannot keep these luxations reduced, it is interesting to know what comes of them when they are left to themselves. M. Nélaton says that they do not impair, in the slightest degree, the usefulness of the limb. The patient is able to use it, as if nothing had ever happened to him.

The patient was simply advised to keep his arm, for a few days, until the soreness had gone, in a sling.

Luxation at the Hip.

February, 1853. An old woman, who entered the wards on account of an abscess situated on the thigh, was laboring under luxation of both femurs; one at the right side, congenital; the other, which had occurred several years after birth, was spontaneous.

The method adopted by M. Nélaton, to detect the luxation on the left side, was to flex the thigh to a right angle with the pelvis, and, in this position, to draw a line, passing from the anterior-superior spinous process of the ilium to the summit of the tuberosity of the ischium. In its normal position, this line passes over the top of the great trochanter; here, in this patient, the trochanter projected two inches behind and above it.

In some cases, this is the only sign of the luxation. Suppose, for instance, a double congenital luxation; the child does not walk, and yet both the lower limbs are of equal length; moreover, all the parts are so fat and so rounded, that the bony projections are concealed; by placing him on his side and drawing this line, the position of the bone is detected at once. It should be added, however, that a certain degree of anatomical knowledge is required for this exploration, as the pelvis of a child is not exactly the same as that of an adult, and there is also a difference between men and women.

By a movement of torsion, the foot being turned outwards, the head of the bone was seen to raise up the muscles at the side of the ilium. In this case, by pulling the limb in the direction of the axis of the thigh, it could be felt to move in that direction; this, though not so common as Dupuytren says, is yet quite often seen to exist.

The other luxation was immovable; what is quite remarkable, the abscess, which was just at the side of the articulation, did not communicate with it. This abscess had formed after the birth of a child.

M. Nélaton gives the following table of the signs of the four kinds of luxation of the femur.

ILIO-ISCHIATIC.	ISCHIATIC.	ISCHIO-PUBIC.	ILIO-PUBIC.
Projection of the buttock.	Projection of the buttock, outward and downward.	Flattening of the buttock; depression over the great trochanter.	Flattening of the buttock.
Elevation of the fold at the buttock.		Depression of the fold.	
The head of the femur is felt in the external iliac fossa.	The head of the femur is felt immediately over the ischium.	The head of the femur is felt at the internal and upper part of the thigh, before the ischium.	The head of the femur is felt in the groin.
Elevation and projection, backward, of the great trochanter.	Depression and projection, backward, of the great trochanter.		
Slight flexion of the thigh.	Slight flexion of the thigh.	Flexion of the thigh.	Extension of the thigh.
Abduction.	Adduction.	Abduction.	Abduction.
Rotation inward.	Rotation inward.	Rotation outward.	Rotation outward, or inward, of the displacement is very great.
Slight flexion of the leg on the thigh.	Slight flexion of the leg on the thigh.	Flexion of the leg on the thigh.	Extension of the leg on the thigh.
Shortening from two to eight-fifths of an inch.	Lengthening, from two to four-fifths of an inch, in extension; shortening in flexion.	Lengthening from six to ten-fifths of an inch.	Shortening from two to six-fifths of an inch.
Communicated movements, possible, except abduction and rotation outward.	Communicated movements, possible, except abduction and rotation outward.	Communicated movements, possible, except adduction, rotation inward, and extension.	Communicated movements, possible, except adduction and rotation inward.

CHAPTER VIII.

AFFECTIONS OF THE ARTICULATIONS.

Gonorrhœal Arthritis at Shoulder.

JULY, 1853. A young man presented himself at the consultation, on account of pain at the head of the humerus, the result, he said, of exterior violence, received while at play with his comrades. There seemed to be something singular about the case, and the patient was admitted to the hospital.

Bearing in mind all the anatomical elements about the joint, a careful investigation was made of them, and they seemed to be exempt from all change. In the clavicle, scapula, and humerus, nothing could be found; in the muscles there was no pain, no signs of rupture, and particular care was taken to examine the deltoid, the biceps, and the great pectoral—ruptures of the biceps are quite often found, either in the muscular tissue, or in the tendons, and, generally, in the tendon of the long head—no bone had been torn off where the muscles are inserted; all the movements of the articulation could be made, but not, however, to their fullest extent.

The favorite seat of pain, in cases of effusion into the scapulo-humeral articulation, is in the anterior part of the head of the humerus, and here, although other parts were painful, the pain was greatest there. The effusion was not very considerable, but still a collection of liquid in the articulation could be detected. It is very easy to find a collection of water in the knee; it is impossible at the hip, and at the shoulder it must be of a certain magnitude, and it must be sought for in a particulur place, namely, behind and below the spine of the scapula.

When this effusion was detected, and no other articulation was found to be attacked, the patient was asked if he had a running from the urethra, and he gave an affirmative answer.

A gonorrhœal hydrarthrosis can be manifested in any joint; in the immense majority of cases, it is in the knee; after that, in the hip; then in the temporo-maxillary articulation, and this one, of the shoulder, is, perhaps, the rarest of all.

These cases of blennorrhagic arthritis have some characteristics; they are generally mono-articular; they are not subject to changing from one articulation to another; and a third characteristic is, that the effusion is generally quite considerable.

Tubercle of Bone, near the Elbow Joint.

July, 1853. A young girl with white swelling at the ankle-joint, and with an affection situated very near to the articulation at the elbow.

The humerus was all right, the radius also, and there was no effusion in the joint. The collection of liquid, here, shows itself at the sides of the tendon of the triceps muscle, or, where there is least resistance, as it does in all joints; near the base of the olecranon process, however, was a projection, that gradually lost itself in the parts around, and the central portion of which was soft.

This case, M. Nélaton said, he did not hesitate to pronounce one of tuberculous affection of the bone, like those described for the vertebræ, under the head of Pott's disease; that form in which the tubercle is in an encysted mass. Tubercle is deposited very near an articulation, in the spongy tissue of the bone; in its neighborhood there is some osteitis, in consequence of which, new layers of bone are formed, but in spite of that the tubercle advances nearer to the surface, and at last opens. Here, this tubercle had cleared the bone, and had arrived under the skin, causing an abscess.

Now, suppose that a tubercle was developed nearer to the articular surface of the bone; in place of opening as this had done, it will open into the joint. This is not a mere speculation, but it has been observed, and M. Nélaton related several cases, where, after the appearance of a swelling about a joint, most acute pain had suddenly occurred; and an examination afterward had given this explanation of what had been observed. It is just as when a tubercle opens into the pleural cavity. These acute symptoms pass into the chronic stage, and a white swelling of the joint is formed.

Here the disease had a natural tendency to get well; and by opening the abscess, and making an injection of iodine, there was a good chance of hastening the cure. As to the closing of these abscesses, there is a cavity in the bone, lined by a membrane; granulations form upon it, gradually fill it, and the parts cicatrize.

White Swelling at the Wrist.

One of the cases, under the head of necrosis of the metacarpal bone, is also interesting, and perhaps chiefly so, as one in which a cure of a white swelling was effected by means of cauterizations, with the actual cautery, about the joint.

April, 1853. A man, fifty years of age, a public letter-writer, with an affection of the wrist. His profession, as is seen, was not at all a fatiguing one; he had never had rheumatism nor syphilis, nor had the joint ever been submitted to violence. He had commenced to suffer four or five months before, and had gone to a hospital where blisters had been applied, and cauterizations made use of, but the disease had always gone on increasing.

The volume of the wrist, above all, in the dorso-palmar diameters, was very much exaggerated; in addition to the general tumefaction, there were two projections superadded, and in them there was something peculiar: they were soft and fluctuating. Fluctuation, in regions like this one, must be found in the direction of the axis of the limb, and not transversely, and, in addition, the extent of the fluctuation must be determined. These projections were caused by two collections of pus; one, occupying the lower two-thirds of the forearm, was deep-seated: the flexor carpi radialis, and the superficial flexor of the fingers covering it; the other was on the back of the wrist, and superficial.

In white swellings, there is a particular displacement for each articulation; and, for the wrist, it is such that the bones of the forearm are placed behind, and those of the carpus in front. This displacement, which was very well marked in this case, can only take place after an extensive destruction of the means of union about the articulation. To prove this destruction, movements could be performed, that are prevented by the ligaments when they exist; the wrist could be moved from side to side, without changing the parallelism of the axes of the forearm and of the hand.

In addition to the destruction of the ligaments, and the formation of purulent collections in the neighborhood, there was softness in the thickened tissues of the joints, and, by careful palpation, pulsation could be felt. This pulsation has been mistaken sometimes for encephaloid cancer of the bone, and M. Nélaton said he had been deceived himself, before he was aware of the fact that articular fungosities could give rise to it. Here, then, were fungosities of the synovial membrane, and, supported on one side by the bones, the pulsations were slightly sensible to the fingers on the opposite side.

Destruction of the ligaments, fungosities of the synovial membrane, abscess about the joint—in such cases, amputation is the only resource.

This patient's arm was amputated, with a circular flap, as near to the wrist-joint as was possible, and he recovered.

April, 1854. A young girl entered the hospital, with an enormous swelling about the wrist. The normal shape of the articulation was gone, and a portion of the hand, the thenar eminence, was also very voluminous; on the dorsal surface, there was not much tumefaction; there were only two fistulous orifices in the neighborhood of the joint.

The condition of the parts was most unfavorable, yet it was a right hand, and its loss would have been a terrible deprivation to the poor girl. There were still four good fingers, and M. Nélaton said he hoped that the disease might be rather in the tendinous sheaths than in the joint itself. He had seen such cases, and one, even worse than this, in the knee, where cauterization had succeeded against all his expectations in relieving the patient.

Cauterizations, and made with energy, would be tried; there was, at least, a hope of ameliorating the condition of the parts, and then, perhaps, a partial amputation might be made.

The result, in this case, I am not acquainted with.

White Swelling in the Feet.

March, 1852. A boy, sixteen years of age, from Troyes, a city where a very great number of persons are observed to be affected by scrofula. There were a great many cicatrices on his body, situated where cold abscesses generally form. The boy said that, when but five years of age, he had had an affection of the foot; that an abscess had formed there, which did not close for a number of years. Five months before coming to the hospital, the same foot became swollen, and new fistulous openings, discharging pus, were formed.

The integuments, corresponding to the posterior and external portion of the foot, were thin and discolored, and pierced by several fistulous orifices; when a probe was introduced into them, a necrosed bone was encountered. The affection of the bone, as far as could be determined, at that time, was limited to the calcaneum; there were no evidences of its extension to the astragalus.

This patient had no cough; there were no signs of any pulmonary affection; he was young, and at a time of life when the constitution may undergo a change, so that, if relieved of his present affection, he might never again be similarly affected. The only way to relieve him was to remove the sequestrum, and its extent was such, that in order to accomplish this, the whole of the calcaneum would have to be removed. The resection of the calcaneum alone, is not an operation to be thought of; without it, the foot is not only useless, but it is an obstruction; it remained, therefore, to decide between the amputation of the leg, an amputation in the ankle-joint, and one below the astragalus. For reasons which will not be given here, as the same question will be found discussed on several other occasions, the last operation, or the sub-astragalian amputation, as it is called, was selected. The flap is made in the same way, as in the amputation of the whole foot, so that, in case the astragalus should be diseased, M. Nélaton said, it could be removed also.

In performing the operation, the method of executing which will be seen in other cases, the astragalus was found to be healthy, and, therefore, left in its situation. The necrosis was limited to the calcaneum, but, unfortunately, it was situated in its upper portion, and in contact with the articulation with the astragalus. Afterward, the flaps were held in contact by strips of adhesive plaster, and the stump was dressed with cerate spread upon *linge fénêtré*, and *charpie*, held in position by turns of a circular bandage. Coffee, with milk, and soup, were ordered as diet.

The next day the strips were removed, on account of the pressure they exercised upon the parts; the edges of the flaps were in contact with each other, although, M. Nélaton said, he did not believe that they were profoundly adherent to each other. The stump presented an appearance he said he did not like to see; it was smooth and slightly swollen, as if an erysipelas were commencing. For this, he ordered the use of an ointment, composed of one part of sulphate of iron, and five of lard (by weight), which, he said, often arrests traumatic erysipelas; and which seemed to do so here.

The cicatrization of the wound was quite tedious; it was not completed before the expiration of three months; it was not very extraordinary, however, for the cicatrization is always very slow in partial amputations of the foot. It was delayed by the formation of two abscesses in the neighborhood, one anteriorly, and the other at the heel. The boy was kept in the wards until November, in order to determine the definite result of the operation. So far as the material result is concerned, it was as satisfactory as possible; the limb had lost but four-fifths of an inch in length, and the stump itself was perfect. He was able to walk about the hospital very well, but M. Nélaton said it would require a long time to show whether this amputation, by which the inferior face of the astragalus is made to bear the weight of the body, is better than that performed above the ankle.

This patient returned to the hospital in November, 1853, or about twenty months after the operation, in order to satisfy M. Nélaton as to his condition. He walked very well; on one occasion, since leaving the hospital, he had walked a distance of twelve miles, and returned the same day.

November, 1853. A young man, a butcher, about twenty years of age, tall and pale; his health had always been good, according to his own account.

On the eighth of August, while carrying a bucket full of water, he said that he had sprained his foot, but he was unable to tell in what direction the foot had turned, and, moreover, it was an hour after the accident before he began to suffer. Again, the seat of the pain was not in the articulation above the astragalus, as it almost always is in sprain.

When the patient entered the hospital, M. Nélaton called attention to his case, as one in which the surgeon should be upon his guard; it was not a sprain from which the patient was suffering, but a white swelling of one of the articulations of the foot; which one, it was difficult to say, for the articulations of the foot are so tight, that no hydrarthrosis can take place, and one great sign of arthritis is wanting. M. Nélaton said he had very little faith in sprains, as giving rise to those affections of long duration, as authors say they do. A sprain is only a slight degree of luxation, at least, in luxation the same lacerations take place, to a far greater degree, and why, then, do not luxations give rise to white swellings? The explanation is this: The patient cannot *imagine* a preceding dislocation, for the injury is too evident; whereas, a sprain, or twist, may be.

The day after this sprain, the patient said that he was unable to walk, on account of the pain he experienced in the foot, and he went to the hospital Ste. Marguerite, where he was treated for a sprain, by applications of lead water, &c. During four months, however, his foot had not improved; whenever he stood a long time, he suffered; after rest, it was better, but the pain always returned when he exercised the limb.

The form and appearance of the foot, of which the patient complained, were about the same as of the other, except a slight tumefaction at the internal side, about the tarso-metatarsian line; but there was no particular pain on pressure, no redness, and scarcely any œdema. M. Nélaton suspected, then, the affection to be a very serious one, having for its origin an alteration of the bones of the foot; an affection of which the slip was not the cause, but a general state of the economy.

Over the line of articulations, between the tarsal and the metatarsal bones, a great many *vesicatoires volantes* were applied, but without producing much change in the condition of the foot. Transcurrent cauterizations were then made use of, and they seemed to produce a reduction of the swelling, so that the proper time appeared to have come for placing the foot in an apparatus by which all its articulations would be maintained perfectly at rest. The apparatus used was composed of bandages coated with plaster, as described under the head of fractures, and after it had remained for a month and a half, it was removed at the desire of the patient, who felt as if nothing were the matter. In a day or two, however, after its removal, he complained of pain, and a small abscess formed; the pain continued, and in a few days another abscess formed; then another, and then a fourth one, all in the line of the tarso-metatarsal articulations.

By March, 1854, the foot was enormously swollen, the skin thin and discolored, and pierced with fistulous orifices in probing which denuded bones could be felt. The patient was excessively emaciated, and it was necessary to take some decided step in his case, and the only thing to be done was to remove the necrosed bones. It was very certain that the posterior extremities of the metatarsal bones were affected, also the cuneiform and the cuboid, and M. Nélaton thought that even the scaphoid was not exempt. Only the calcaneum and the astragalus, therefore, could be left.

In this case there was an important decision to be made: Were the two sound bones to be left, or was the calcaneum to be removed? or, in the third place, was the whole foot to be removed at the ankle-joint? or, fourthly, was the leg to be amputated above the malleoli?

A few days before, in a case similar to the present, M. Nélaton had performed Chopart's operation, not because he is very partial to that operation, but for particular reasons. He spoke of the turning of the foot by the traction of the gastrocnemii muscles; of the pressure exerted upon the cicatrix against the ground, and of the formation of epidermic pellicles, or true corns, which sometimes force the patient to ask for a new amputation. Nevertheless, it is less dangerous than either of the other operations above mentioned, and, moreover, the patient was an old man, worn out by misery and fatigue, and sixty-eight years of age. A time of repose remained for him, while this young man, whose case is now under consideration, had a life of labor before him.

As to the amputation immediately above the malleoli, it is very good, in the sense that it is, perhaps, not more dangerous than that of Chopart; but it necessitates the wearing of an apparatus. This young man was very poor, and the apparatus often rubs the leg, and gives a great deal of trouble.

As to the operation at the ankle-joint, it was formerly practised, and then almost abandoned, when Mr. Syme, of Edinburgh, modified it by proposing the section of the two malleoli. In the last ten or twelve years, it has often been performed, and very often with success. It is then a good operation; but good, when you cannot do better, that is to say, when you cannot leave the leg longer, and perform one that is less dangerous.

The operation of amputating the foot below the astragalus was first proposed in 1839, and it has been found to surpass all expectations. It has been performed in Paris at least fifteen times, by Roux, Malgaigne, and many others. To this operation recourse would be had in this instance; it is a tedious one, as all operations of the same kind are. The following is the method practised by M. Nélaton.

The first step, is to form the flap in the soft parts, and this plan, about which there have been so many discussions, was invented, M. Nélaton believes, by M. Roux, of Toulon. The surgeon commences the incision six-fifths of an inch from the point of the heel, on a line drawn from it to the external malleolus, and carries it along to the external edge of the foot, behind the projection formed by the posterior extremity of the fifth metatarsal bone; then obliquely across the sole of the foot, and passing over the projection of the scaphoid bone, and over the dorsal surface, an inch and three-fifths in front of the angle it forms with the leg, it is brought round to the point of commencement. This incision incloses a flap of soft parts, by which the bones are covered, to use M. Nélaton's expression, to *perfect perfection.*

The second step of the operation, is to make a movement by which the anterior extremity of the foot is forced in the direction of its internal and plantar surfaces, so as to make the head of the astragalus project; and when this has been done, nothing is more easy than to divide the ligaments by which the bones are held together.

But now, in order that the operation be well done, all the soft parts, inclosed by the incision made in the first step of the operation, must be preserved, and the bloodvessels must be respected as they pass along the internal side of the articulation. For this purpose, the surgeon must extract the calcaneum *by resecting it*, and this is very laborious; the tendo-achillis and all the parts must be separated as near as possible to the bone. The surgeon must never expect to do this operation as he does that of Chopart.

This is what M. Nélaton said he would do. He also desired to show that the same method, except that the flap should be made a little smaller, would answer in amputating at the ankle-joint, in case the astragalus should not be found entirely healthy; in which case, also, the malleoli should be removed. These two operations, above and below the astragalus, differ in this, in the length of the limb left afterward; a difference amounting to one inch.

At the operation, the patient was placed on his back upon the operating-table, one assistant pulling up the skin of the leg, and another compressing the artery in the groin, for I have never seen the tourniquet used at an amputation in Paris. M. Nélaton held the extremity of the foot with his left hand. The operation did not occupy much time, as none is lost when the surgeon advances by every movement he executes.

In this case, as in the other, during the cicatrization of the wound, in the first week of the operation, the sheath of the tibialis anticus became inflamed, and an abscess formed; and a few days afterward, another abscess formed at the heel, or at least was opened there. In six weeks, the wound had entirely healed, and the patient went home. The stump was round and well formed, and when pressure was made against it there was no pain. The under surface of the astragalus is not regular, but by degrees it becomes so, and the projections there, from which bad effects might be feared, disappear. The shortening, as measured by the difference between the two limbs, was only four-fifths of an inch, and admitting that some sinking would occur after walking, it could never be more than an inch in all. This shortening could be obviated by a shoe.

February, 1854. A man, a locksmith by trade, sixty-eight years of age. Not long before coming to the wards, he had had an attack of pneumonia, for which he had remained a long time in a hospital.

Six months previous to his entrance, he had been forced to leave off working on account of pain in the knee, but after a rest of a few days, during which time poultices were kept around the joint, it disappeared. There were no signs, then, of any affection in the neighborhood of that articulation. Two months afterward, he noticed that his right foot, during the day time, always became swollen, and that in the night, this swelling disappeared. In the morning, this foot was very painful, but the pain ceased after standing upon it for a certain time. After some time, the augmentation of volume in the foot remained, not disappearing by rest in bed, and the pain became so great, that the patient was forced to seek relief.

The right foot was very much swollen, the œdema extending as far as the leg. The projection was greatest at three points; one, at the articulation between the first metatarsal and cuneiform bones; another, at the posterior extremity of the third metatarsal; and a third, at the external border of the cuboid. At these three points, there was distinct fluctuation; two abscesses existed there. The skin covering these abscesses was scarcely changed; just over the middle projection it was slightly violet-colored and shining, but nowhere else. These collections of pus were deeply situated, for the tendons of the extensors could be found running over them, and, moreover, they did not communicate with each other.

As the cause of these abscesses, an alteration of the bone was the first idea, for the first two were situated exactly on the line of the tarso-metatarsian articulation, and the third was upon the cuboid bone. When the first metatarsal bone was moved, the patient suffered very much, and also when the foot was twisted. It was impossible, then, to say precisely which of the bones were affected, though the line in which the abscesses were placed, seemed to indicate either the cuneiform or the metatarsal.

As to the treatment of the case, it was impossible to think of proceeding any further, without more precise knowledge of the condition of the parts, and M. Nélaton said he would open these collections of pus and introduce a probe. If the affection of the bones should show itself in the form of small sequestra, they would be extracted; if not, the foot would be amputated, very probably by Chopart's method. The scaphoid, perhaps, might be left, but it would be of no advantage.

When the abscesses were opened, pus of a bad character came out, and a probe, introduced, came at once in contact with dead bone. This dead bone was firmly fixed.

This man was old and infirm, and it would have been impossible for him to support so long a sojourn in the hospital, as waiting for the elimination of the dead bone would have required; an operation for its removal was demanded. It was necessary, owing to the situation of the necrosis, to pass behind the anterior face of the tarsal bones, and M. Nélaton thought that, by passing between the calcaneum and astragalus, and the scaphoid and cuboid, or, by performing Chopart's operation, the whole of the disease would be removed. Some surgeons, under the same circumstances, would perform an operation under the astragalus, and others would even amputate the leg, and it was necessary, therefore, to give his reasons, M. Nélaton said, for preferring the operation of Chopart.

It has been objected to Chopart's operation, that bones are left, which are healthy in appearance, but which would soon require removal. In fact, in a child, when disease has long continued, if you examine such bones, you can traverse them from one end to the other with the point of a bistoury, and, of course, there is great likelihood of a continuation of the disease. But, it is only in white swellings of very long standing, and, moreover, particularly in children, that this interstitial atrophy takes place. Again, it has been said that the stump is turned, so that the cicatrix is pressed, in walking, against the ground. This is true for some of the patients, but M. Nélaton said that, for his part, he had seen cases where this turning had never taken place. Moreover, to diminish the chance of its occurrence, some precautions can be taken; the small apparatus invented by M. Robert[1], in order to maintain the heel in position, may be used. Again, the tendo-achillis may be divided, but this must not be believed to be effectual in every case; M. Nélaton did it once, and a year afterwards, the man entered another hospital, when the tendon was a second time divided, and the man again cured; at the expiration of another year, it was a third time divided, and again cured;

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[1] M. Robert has written an excellent memoir on Partial Amputations of the Foot.

and it was divided a fourth time by M. Robert, who afterward applied his apparatus, and the man went out cured—M. Robert says permanently, but M. Nélaton said he would not be surprised to see him enter again for relief.

M. Nélaton accepts this operation, because it seems to him to be less dangerous than a sub-astragalian. This is soon cured, while the latter is long and tedious; a long suppuration must always be expected after it. The patient could not endure that. The same was to be said of the operation in the ankle-joint. As to amputation above the malleoli, M. Nélaton does not believe it to be more dangerous than that of Chopart, but the result is not the same; after it, a very costly apparatus is needed, and one requiring great care. This poor man could not obtain one, and he would be forced to abandon his work; while after Chopart's operation, he would have a point of support for the limb.

This operation is very easy, and yet at the examinations on operative surgery (in Paris), it is one of the worst performed by the students. The parts are disposed as follows: on the dorsal surface of the foot, the line of separation between the bones is in the shape of the letter *S* (Italic); being concave, backward, between the astragalus and scaphoid, and convex between the cuboid and calcaneum. Again, between the astragalus and scaphoid, the line of separation from above downward is not perpendicular, but oblique, running from above downward and backward; on the external side of the foot, or between the calcaneum and cuboid, it is perpendicular. Now that the direction of the line separating the bones is known, the surgeon must recognize on the foot covered with its soft parts, certain points necessary to find. Internally, the tuberosity of the scaphoid is found quite easily; it is the first in front of the malleolus, and the articulation is immediately behind it; externally, there is no direct *point* to find, but about half an inch behind the projection of the posterior extremity of the fifth metatarsal bone, is the spot where the knife is to be carried. As to the intermediary points: by twisting the foot, the head of the astragalus is made to project, and the knife, drawn between the two points above indicated, falls at once into the articulation. As to the ligaments, they are attached to the bones at some distance from their edges, and if the instrument is at all in its proper place, they will be divided. This is for the dorsal ligaments; there are deep-seated ligaments also, but nothing is more easy than to divide them.

The section of the soft parts, for the formation of a flap, is made after very different proceedings; which M. Nélaton did not discuss. On the dorsal surface of the foot, it should not be made directly upon the articular line, but a very little in advance of it; not so as to dissect a flap, but still so as to be in front of that line. In dissecting the flap from the sole of the foot, M. Nélaton prefers to cut from without inward; the old way of doing it was to disarticulate the bones, then to pass the knife behind and under them, and to cut the flap from within outward. To avoid the notching of the flap, it has been advised to make small incisions, internally and externally, meeting the extremities of the incision on the dorsal surface; now, why should not these incisions be continued, so as to mark out, at once, the whole of the flap on the plantar surface of the foot.

At the operation, the first incision made on the back of the foot opened at once the articulations; then, on the sole, the long curved incisions were made, circumscribing the whole flap; and then the anterior portion of the foot was dislocated, and the flap completed.

For the rest of the day, the man did not complain, but in the night, he had violent pain in the stump with an oozing of blood from between the edges of the wound. The next day, there was a great deal of blood in the dressing, and there was every appearance of great effusion of blood under the flap. The question was, whether the flap was to be opened, the blood cleaned out, and then closed up again; as must be done in some cases where the blood cannot be removed without doing so. In one case, which M. Nélaton related, after an amputation of the thigh in the hip-joint, effusion took place under the vast flaps, and he opened and cleaned them; this patient got well. In this case, however, the blood was expelled by pressure, and after that the patient no longer suffered; and the stump healed admirably.

At the examination of the parts removed, the bones were found to be diseased in the neighborhood of the tarso-metatarsal articulation; the cartilages covering their extremities were in great part absorbed; and, besides, there were fungosities of the synovial membrane.

The patient himself went out well, at the expiration of about three weeks.

January, 1853. A woman, thirty-eight years of age, who supported herself by needle-work, entered the wards for white swelling at the foot. She was rather delicate in appearance, but she said that she had always had good health; she was very subject to catching cold, but never had spit blood, except in small threads.

Eighteen months before, she had made a misstep, and this, according to her, was the original cause of her disease. M. Nélaton's doubts as to the agency of exterior causes in the production of these articular diseases, have been already frequently mentioned. It was only some weeks after this misstep, that she began to suffer in her foot; and, moreover, when she did suffer, it was not in the articulation between the astragalus and the calcaneum, which is the articulation affected when the sole of the foot is turned inward or outward. A luxation is never given as the cause, and it would seem as if a disorder, much more extensive, was much more likely to produce these affections. The reason why white swellings are attributed to sprains, is this: that everybody can remember to have sprained the joints at some time or other. These affections are, almost always, spontaneous, and are owing to a general disposition of the economy.

At all events, this foot swelled and suppurated, and when the patient presented herself, an alteration so extensive of the bones was found, that amputation was demanded. In these cases, however, it is necessary for the surgeon never to limit himself to a superficial examination, and this was found after several careful examinations to be the condition of the parts: the posterior portion of the foot was healthy, meaning by that, all the part comprised by the calcaneum and the astragalus; at the union of the anterior with the posterior portion of the tarsus, there were five or six fistulas, all in the line of the articulations, between the calcaneum and astragalus, and the cuboid and scaphoid. By introducing a probe into these fistulous orifices, the scaphoid bone was found to be altered, the middle cuneiform, and also, very probably, the external cuneiform; from the explorations made with the instrument, the articulations of the calcaneum and astragalus with the cuboid and scaphoid seemed to be healthy.

It was necessary to remove these diseased parts, and there was a choice to be made between several operations: Chopart's operation, disarticulation below the astragalus, above the astragalus, and amputation above the malleoli. Here, on account of the feebleness of the patient, M. Nélaton preferred amputation above the malleoli, to any of the others, as less liable to be followed by long-continued suppuration. He said he believed that, after being submitted to a long suppuration, a patient is often attacked by tubercles of the lungs. A case was related of a most *magnifique* young man, upon whom he performed amputation of the thigh at the hip-joint, in the month of June. The suppuration continued for five or six months, until the wound had healed; the patient grew thin, coughed, and expectorated largely, and finally he died of phthisis pulmonalis. This woman worked at home; she walked very little, and, therefore, although the operation of Chopart leaves a much more favorable limb for progression, the amputation above the malleoli was chosen as less dangerous. All the reasons by which he was determined to choose this operation, were, as M. Nélaton expressed it, *reasons of prudence.*

In practising this operation, there are some things to be attended to. The flap must be so constructed, that the cicatrix is placed as far as possible behind; because then it is less subject to pressure and to injuries, and, besides, it permits more readily of the escape of the pus. On this account, the section should be made oblique, so as to procure the most of the flap in front; this patient was too emaciated to admit of this, but it can be done in a muscular individual. Again, this operation being practised in the very narrowest part of the limb, in turning back the skin, it is forced to cover a larger part than before. To facilitate the turning back of the flap, it has been advised to make an incision in the flap in the direction of the axis of the limb, and when this is done, it is best to make it behind. Very often, however, this incision is unnecessary, particularly when the operation is performed very low down.

After the operation, which was performed without anything remarkable taking place, everything went on very well, and cicatrization was nearly completed, when on the twenty-fifth day, at three o'clock in the afternoon, the patient was seized with a chill, lasting for two hours, followed by fever and perspiration. This inspired the gravest fears, for thus begins the affection which carries off the majority of those upon whom amputations are performed in the Parisian hospitals. How could it be told whether this affection was really purulent affection or another, announced by a sudden chill? It might be the commencement of erysipelas, or if an internal disease, of pleurisy, pneumonia, or some intestinal disorder. There was nothing to be found in the chest, nor had the patient any diarrhœa, or pains about the abdomen; by examining the limb, however, the marks of erysipelas, and above all, of an angeioleucitis were discovered. This was very reassuring, for in place of purulent affection, as was feared at first, a disease almost always curable was to be dealt with.

In order to detect angeioleucitis, a certain degree of attention is necessary; the lymphatic vessels must be sought for where they are grouped together; on the leg, for instance, where they ascend on the external side and cross below the knee, in order to place themselves on the internal and posterior portion of the internal condyle of the femur, when they are reflected forward like the sartorius, on which they are placed, and ascend vertically to the glands of the groin. These vessels, in this case, were enlarged and hardened, and pressure upon them caused great pain. Besides a redness in the neighborhood of the wound, there was a slight tumefaction; but, above all, there was pain. The pain on pressure extended all the way up the limb, along the course of the lymphatics, as far as the glands of the groin, which also were swollen and painful.

Frictions with mercurial ointment were made use of for this complication, and as the patient was very feeble, tonics were administered. She soon afterward left the wards cured.

White Swelling at the Ankle-joint.

In December, 1851, an amputation similar to the one described in the last case of white swelling of the foot, was performed in a case of white swelling at the ankle-joint. The operation was performed by one of the two *internes*, to whom M. Nélaton always affords an opportunity of practising some important operation, a short time before leaving his wards.

The patient was a woman, who had been attacked with inflammation of the joint soon after her confinement, and, according to M. Nélaton, white swellings occurring under such circumstance are, as a general rule, particularly serious. The joint had suppurated: fistulous orifices communicated with the exterior; the patient was exceedingly prostrated, and, for some time, had been affected with diarrhœa. Her affection was incurable, and the removal of the parts was urgently demanded.

The incision, which was made just above the malleoli, was circular, but very oblique, as in the preceding case, so that the anterior portion might fall by its own weight and cover the bones. In this way, the suppuration readily escapes below, and there is less danger of retention of the discharge, and, consequently, less danger of purulent affection, which is so much dreaded.

It was found, however, the next day, that the anterior portion of the flap did not cover the wound; in spite of the oblique direction in which the section had been made, the result obtained was exactly the same as that observed in the circular operation, usually practised. This was thus explained by M. Nélaton: in holding the foot, it had been pushed down, so that the section of the anterior portion of the soft parts was made with the skin forcibly distended, while, on the contrary, that of the posterior part of the limb was relaxed. The surgeon should always pay attention to this.

At the examination of the amputated parts, the articular surface of the three bones, entering into the composition of the ankle-joint, was found covered with a layer of what resembled fleshy granulations. This layer proceeded from the bones themselves. In these cases, the cartilage disappears by absorption, and the bony tissue is left exposed; for the first few days, it is white, and of its usual appearance, but afterward, at some distance from the surface, a number of red spots are perceived, which by degrees become more perceptible, and approach the surface, until at last they are only covered by a thin pellicle of osseous tissue, which itself disappears in a few days, and the surface of the bone is covered by these red spots, which are nothing but granulations. The phenomena which take place here in the articulations, are precisely the same as those which take place when a bone is denuded of its periosteum.

After remaining in the wards about a month, the cicatrization of the wound was completed, and the woman went out cured.

White Swelling at the Hip.

June, 1852. A young man entered the wards, as affected with coxalgia. There was a deformity at the hip, but nothing characteristic in it; the thigh itself being in its normal position with respect to the pelvis.

The articulation supposed to be affected, possessed all the characters of a healthy articulation. In order to make this examination, as the movements of the femur can be masked by the movements of the pelvis, M. Nélaton employs the following method: One hand is placed behind the pelvis, so as to grasp the sacrum and the crests of the iliac bones; by the other hand, at the knee, first one thigh is moved, and then another, and attention is directed to the movements communicated to the pelvis. Beside the freedom of execution of the movements, the characteristic points of pain did not exist; there was none whatever in the groin, internally to the femoral artery; and although there were pains in the knee, they were real, and not symptomatic. According to M. Nélaton, to recognize a pain at the knee as real or symptomatic, it is sufficient to know that, when it is symptomatic, it makes itself felt in the patella or in the popliteal space; but when it is real, it is always felt on the internal side of the knee; that is to say, where the internal lateral ligament is attached to the head of the tibia.

The true cause of the deformity, in this case, was found to be an affection of the lumbar vertebræ.

July, 1852. There were two patients in the wards with coxalgia; one of them a young boy, with the appearance of fine health; the other patient was also a boy, but he was quite feeble. From the history of the symptoms, there was no doubt as to the existence of the disease; in one patient, the pain, at the commencement, was about the middle of the patella; in the other, it was in the popliteal space. The first question to decide was, whether complete luxation had taken place, or not.

When the younger patient was uncovered, and the two limbs placed, as much as possible, in the same position at once, the apparent shortening of the limb, on the affected side, was most striking; it seemed to be at least two inches. This appeared to indicate a displacement of the head of the bone, a luxation upward upon the dorsum of the ilium; but, by measurement from the anterior superior spinous process of the ilium to the condyle of the femur, this affected side was found to measure three-fifths of an inch more in length than the other. This must be explained; and in order to do so, it is necessary to know how these things are in an individual in perfect health. It used to be supposed, before these points were properly studied, that all these variations in length were to be attributed to a displacement of the head of the femur; lengthening indicated an incomplete expulsion out of the cotyloid cavity, and shortening was explained by a luxation upon the dorsum of the ilium.

If the soft parts are removed from the pelvis and the femur of a subject who had no disease about them, and, the sacrum being firmly fixed, movements be given to the femur, it will be seen that, in abduction, the limb appears shorter, and in adduction, it appears longer. In the different movements executed by the femur, the head of this bone turns on itself, around a point which corresponds to its centre; this point is the centre of all the movements of the thigh. If, from this point, a line be drawn to the anterior superior spinous process of the ilium, and one to the external malleolus, or to the external condyle of the femur, these lines will form an angle with each other, which will be more or less acute; and consequently the base of the triangle—which is represented by the line connecting the places used for measuring the length of the limb—will be longer or shorter, as the femur is carried inwardly or outwardly. There is, then, in adduction, an apparent elongation in the measurement, although the head of the femur has not been pushed out of the cotyloid cavity. The same demonstration will explain how the apparent length of the limb varies, as it is measured in extension or in flexion: the spine of the ilium being in a plane anterior to the centre of the head of the femur, the two lines, before supposed, will form with one another an angle open in front; and they will approach each other in flexion of the thigh on the pelvis, while, in extension, they will separate more widely. *The greatest apparent length to measurement is then given by a combined movement of adduction and of extension; the most marked shortening, by flexion united to abduction.* In this boy, the sound limb was in a state of abduction, and the affected limb in one of adduction; and the difference in the measurements of the two sides was to be accounted for by this difference in the positions of the femurs, relative to the pelvis, and not to any displacement of the head of the bone by effusion in the cotyloid cavity.

This same position of the femur with respect to the pelvis, which gives rise to a shortening in the measurement, produces to the sight an apparent elongation of the limb. The adduction of the femur of the affected side leads, of course, to the abduction of that on the sound side; and the vertebral column, in its lumbar portion, must incline towards the affected side, and the crest of the ilium, on that side, will be elevated. Now, the two femurs, articulated at the sides of the pelvis, represent two columns suspended at the extremities of a transverse beam, sustained in the middle; as soon as one extremity of the beam is depressed the other is elevated, and the limbs attached to this movable lever will necessarily appear of unequal length. The lateral inclination of the pelvis will produce, therefore, an elongation or a shortening, which will be only apparent, for the superior extremity of the femur will have preserved its normal relations with the ilium.

The most correct mode of determining the true position of the head of the femur, consists in determining its position with respect to a line drawn from the most projecting portion of the tuberosity of the ischium to the anterior superior spinous process of the ilium. In its physiological condition, when the femur is at a right angle with the pelvis, the great trochanter just touches this line; and if, therefore, the trochanter be found in this position, no displacement has taken place. In this child, the trochanter was where it ought to be, with regard to the above-mentioned line, and consequently no displacement had taken place. In the other patient, at the same time in the wards, the great trochanter was thrown two inches behind that line.

Why is the limb sometimes in abduction, and at others in adduction? When an injection is forced into the cavity of an articulation, the bones composing it assume a certain position one to another—a position which never varies, and in which the articulation can contain the greatest quantity of liquid. That position in which there is adduction, with rotation inwards of the femur, is the one in which the articulation at the hip can contain the most; and this is the position almost always witnessed at the commencement of the affection. By carefully studying this articulation, it is seen that the capsular fibres are much strengthened, anteriorly, by a fibrous band, extending from the inferior anterior spinous process of the ilium to the internal part of the base of the neck, called the ligament of Bertin. The rest of the capsule, yielding, before this portion, to the liquid effused into the joint, a time comes when, by means of this inextensible cord, the limb is brought into the position of adduction.

By a real shortening of the thigh, therefore, must be understood a change in the relative position of the head of the femur, and the only way to detect this, is, placing the child on his sound side, to find the position of the great trochanter. If its superior extremity touches a line drawn from the anterior superior spinous process of the ilium to the tuberosity of the ischium, there is no displacement.

February, 1853. A young girl from the country, about twenty years of age, entered the wards on account of an affection at the right hip.

According to her own account, three years before, she used to work in the fields, and in cutting grass, which was her usual occupation, she placed herself habitually on her knees. From that time, she commenced to suffer in the right lower extremity, but in what part it was difficult to make her say. At the knee, where the pain in coxalgia commences, she always said she never had had any, and it is excessively rare that it is absent; M. Nélaton insisted upon this, indicating the anterior face of the patella, and the popliteal space, but the girl was positive that she never had suffered there. She had pain, however, at the time of her entrance, in the lower anterior portion of the thigh. One day, the pain in the limb was so violent, that she was forced to stop working, and had to be dragged home, hanging on to the saddle of her donkey, for she was unable to get up. A physician was called, who prescribed rest in bed, and applied blisters over the great trochanter. She improved, but afterward became worse again; when she went to a quack, who treated her very properly with moxas. She improved a second time, but again commencing to suffer, she came to consult a surgeon in Paris, who, she said, put her to sleep and bent the thigh. Not getting any better, she came to M. Nélaton's wards.

At that time, the thigh was not much flexed upon the pelvis; which, together with the absence of pain at the knee, was a second exception to what is usually seen in these cases. The thigh, however, was slightly flexed, and at the same time slightly carried into abduction. At the upper part of the thigh, could be felt a very hard, almost bony mass. In the groin, there was some little pain on pressure, and, also, everywhere around the articulation. When the two limbs were placed together, the lower extremity on the affected side seemed, to the sight, longer than the other; when they were measured, in place of a lengthening, a shortening was found. M. Nélaton said he did not hesitate to declare both this elongation and this shortening to be apparent, that both measurement and the sight were at fault. The pelvis, on the sound side, was elevated, while, on the other, it was depressed, which accounted at once for the apparent lengthening to the sight; by this position of the pelvis, also, the femur, on the affected side, was thrown into abduction, and that, together with the flexion of the limb, diminished the distance between the anterior superior spinous process of the ilium and the internal condyle. What is generally found in these cases, is apparent lengthening in the measurement, and shortening to the sight. When this patient was placed upon her sound side, the great trochanter was found to be in its normal position.

In this case, then, there was no articular displacement, and M. Nélaton said he thought the affection to be curable. The treatment would be that he always makes use of in chronic inflammation of the joints, transcurrent cauterizations.

This treatment was put into practice; a number of long, deep, and narrow tracts being burned with the red-hot iron, over the great trochanter, but the patient did not remain in the hospital sufficiently long for the result to be given.

At the same time that the patient, whose case is reported above, was in the wards, another woman, with an affection about the hip-joint, entered, and remained a few days. Her case presents some points of interest, and it is therefore given, although, on some accounts, it is very unsatisfactory.

This patient was an old woman, about sixty years of age; there was nothing to remark in her constitution, nor in her antecedents. Fifteen months before coming to the hospital, she received a fall upon the right hip; she got up with much pain in that part, which became worse, and she was forced to go to bed. The woman said she found that the limb became shorter and shorter. After a few days, she decided to go to a hospital, where a fracture must have been supposed to exist, for the patient was placed in an apparatus of permanent extension. After a time, judging from the change in the treatment, the case must have been supposed to be one of chronic inflammation of the hip-joint. She left this hospital, and, soon afterward, entered the wards of M. Nélaton.

When this patient was placed on her back in bed, the legs alongside of each other, a difference in their lengths in favor of the sound side, equal to two hand-breadths, was visible. The pelvis was very much inclined, being elevated on the affected side, and depressed on the other. The limb affected was shorter to the sight, and shorter also to measurement; there was *real shortening* in this case. By *real shortening*, is meant a diminution in the distance between the centre of movement at the head of the femur and cotyloid cavity, and the internal condyle; by it, M. Nélaton said, he designated all the difference in length depending upon one of the three following conditions: 1st, displacement of the centre of movement at the articulation between the head of the femur and the cotyloid cavity; 2d, a fracture; 3d, a defect in the development of the bone. In this patient, the cause was to be sought for in a displacement of the head, or in a fracture of the neck; at her age, of course, it could not be the third condition.

The patient being in bed, the limb was shortened, and in a position of adduction; the foot rotated neither inward nor outward. There was very considerable tumefaction of the thigh; the upper part, particularly, was hard and engorged. On the internal face, some distance below the groin, was a fistulous orifice, discharging a sero-sanious liquid, into which a gum catheter could be introduced its whole length, the point towards which it directed itself being the articulation. The limb itself was almost immovable; sometimes, when there is no motion at the hip, the articulations of the pelvis come to its aid, and in order not to be thus deceived, the surgeon should place one hand behind, over the sacrum and the crests of the ilium.

It was very difficult to decide what was the true nature of the injury in this case. It is not very rare to see very rebellious inflammations following falls upon the hip. There had been a fall here, and it must be remarked that, in this part of the body, exist the most favorable conditions for a deep-seated contusion; the great trochanter is just under the integuments, the neck of the femur is very short, the cotyloid cavity cannot move in any direction, and all the force of the fall is concentrated there. Look at the shoulder, protected by the deltoid muscle, a thick cushion, and by the mobility of the scapula and of the clavicle; again, for the shoulder, the conditions are very favorable for displacement, and, instead of contusion of the joint, there is luxation. The only protection at the hip against contusion, in the old, is the fragility of the osseous tissue in the neck of the femur; in the adult, the neck is very hard. The rule is, that in old persons there is an interstitial absorption in the bones.

Here, M. Nélaton said that he did not dare to pronounce whether there had been contusion or fracture. It was to be remembered, that patients always attribute their affections to some exterior violence, and all the symptoms encountered here, might be dependent upon an affection of the ilium.

The treatment of the case was not without difficulty. There was, already, a large fistulous opening communicating with the interior, and, therefore, there could be no objection to making it larger, so as to admit of the introduction of the finger, in order to make a more thorough exploration, if, by so doing, a useful indication could be fulfilled.

M. Nélaton, however, during the short stay of the patient, was unable to discover the precise lesion in this case.

Hydrarthrosis at the Knee.

January, 1854. A woman, about forty years of age, who had entered the hospital on account of pains in her joints, got better, and was going out, when she became rapidly so much worse in one of them, that she was forced to remain.

The left knee was greatly swollen, the tumefaction extended up nearly four inches on the thigh, and down to the condyles of the tibia; its hardness was surprising; the osseous projections about the knee had disappeared. This tumefaction was general and uniform, but, nevertheless, there were some portions more projecting than the rest; at the superior part, or base of the patella, was one, and there were others at the side of the ligament of the patella.

In order to detect fluctuation at the knee, one hand is placed above the patella, and another below, thus accumulating the liquid under that bone, which is raised up; then, striking it quickly with the forefinger, it is forced through the liquid, and strikes the condyles of the femur, producing a shock perfectly characteristic. In this way, the presence of the smallest quantity of effusion can be detected. But, in order that this exploration may give the expected result, an indispensable precaution is necessary; the leg must be previously extended on the thigh, without which, the extensor muscles and the ligament of the patella being tense, they fix the patella, hold it in the groove between the condyles, and, consequently, prevent the double movement mentioned above.

This pushing back of the patella to give a shock, could not be executed here, for in order to do it the limb must be in extension, as when it is half flexed, the patella is in contact with the condyles. This flexion of the limb, in this case, afforded demonstration of the proposition so well developed by M. Bonnet, that when, in the dead body, a liquid is thrown into the articular cavities, so as to distend them, certain positions are always observed; and this is equally found to be true in clinical cases, *in rapid effusions*. These positions cannot be changed without giving the patient excruciating pain. M. Bonnet has shown the reason of this to be, that the capacity of the articular cavities varies, according to the different movements which are executed in the articulation.

When, therefore, the accumulation of liquid is very great, it reacts on the capsule, and tends to make the limb take that position in which the articulation has its maximum capacity.

This case was a serious one, for a mono-articular rheumatism is the despair of surgeons and of physicians. The treatment would be energetic; twenty leeches would be at once applied about the knee, to be repeated the next day; and powerful derivatives to the alimentary canal would be administered.

This patient got well very rapidly.

February, 1853. A man, about thirty years of age, very large, and of fine muscular development. He was a tailor by occupation, he said, but tailor to a regiment of soldiers, which explained why he was so much more vigorous than tailors generally are.

Three years before, he received a fall, in which the patella was struck against the pavement, and fractured transversely. He entered the military hospital at Versailles, where the limb was placed in extension, the heel elevated, and strips of adhesive plaster were applied to bring the fragments together; after seventy-two days he went out, and was able to walk quite well. Soon afterward he slipped upon the ice, and at once perceived that his knee was hurt; the patient said that his patella had been tied together by a fibrous band, and that it was torn by this fall. He went again to the hospital, when what took place was not mentioned, but what is very curious, a short time after this rupture of the fibrous adhesions between the fragments, he marched on foot, with the regiment, three hundred miles in fourteen days. He said he was able to walk quite well, but certain things were more difficult to do than others, for instance, to go down stairs. Fifteen days before coming to the wards, he wounded himself with his goose, a very heavy piece of iron, weighing ten or twelve pounds; he struck himself with the back part of this on his knee, causing a contusion just above the patella, the ecchymosis of which could still be seen. From that time, he suffered so much in the knee as to be forced to keep his bed, and, at last, to come to the hospital.

The knee was in a half-flexed position, the patient taking, instinctively, that position in which the distension was the least. This is seen in all cases in which *a considerable effusion is produced* *in rather a short time.* The knee was very much swollen, and what was most striking, was the existence of two projections, one at each side, and red at the top. Of course, its conformation was not regular, owing to the previous fracture of the patella, the fragments of which were separated about three inches. The great shortness of the ligament of the patella was very remarkable; normally, it is more than two inches in length, but here, it was not half an inch.

This rupture of the fibrous band, between the two fragments, has been quite often remarked. What he had never seen, M. Nélaton said, was an inflammation of the articulation occurring so long afterward; he believed the cause to be, not this rupture, but the contusion with the heavy iron. That this collection of liquid was really in the articulation, was shown, chiefly, by the half-flexed position in which the knee was placed; and the patient maintained this position purposely, as the one in which he suffered least; the collection projected chiefly in front of the knee, and, of course, if exterior to the joint, he certainly would have kept his knee extended, for the same reason, that thus the distension would be least. Here there was no patella, to tell at once if the effusion was in the articulation or not, by being above or below that bone.

As to the nature of the effusion, M. Nélaton confessed that he was not very sure as to its nature. He was very fearful that some pus was formed, and what made him so, was the peculiar color and thinness of the integuments; there are some things you cannot describe, and that appearance by which pus is indicated is one of them. If it were pus, the man's situation was very critical indeed.

In the treatment, antiphlogistic means were rigidly employed; the day of his entrance, forty leeches were applied to the joint, and powerful derivatives to the intestinal canal were administered. The condition of the articulation seemed to be improving, and, on the third day, a large blister was placed over it. The general condition of the patient, however, became rapidly worse; his sufferings were excessive, and he died, as if exhausted, ten days after his entrance.

In November, 1852, when M. Nélaton re-entered upon his duties at the hospital, his place having been supplied during the summer vacation by M. Sappey, he found a young man, twenty-six years of age, who had entered on the sixth of September, for an affection of the knee. It was a case of hydrarthrosis which had come on suddenly, and without any previous injury. After an ineffectual antiphlogistic treatment, on the fourth of October, a puncture was made into the joint, and a solution of iodine injected. The puncture gave issue to a bloody liquid; the case was one of hydro-hematocele. This operation was not followed by pain or any bad symptom, and the articulation being still swollen, it was repeated on the twenty-seventh of the same month, and a second injection thrown in. This second injection, as the other, was not followed by any unfavorable symptom, but the effusion again formed, and remained, without undergoing absorption.

On the 19th of November, M. Nélaton himself made a third injection. This was followed by symptoms of violent inflammation of the articulation, and, finally, by suppuration in the knee-joint; an affection so serious that most surgeons do not hesitate to amputate the thigh. M. Velpeau says, that when it follows an acute inflammation, the patients die, and concludes that there is nothing to be done but to amputate. At the time, however, when M. Velpeau wrote that, the practice of surgery was not so advanced as it now is; surgeons did not then dare to throw into the articulations the irritating liquids they now make use of. In these cases, the patients die in several ways: exhausted by the suppuration, by purulent infection, or by putrid infection. By means of iodine injections, M. Nélaton said, there was now a check upon the first and the third, and for this reason, he had not spoken to the patient of amputation; the danger from purulent infection remained, but there was some hope that it would not show itself. M. Nélaton had seen a medical student, who, from neglecting a gonorrhœal inflammation of the knee, had a frightful swelling; the synovial membrane had ulcerated, and the effusion had extended a great distance under the triceps. He opened the collection, emptied it, and then applied a tight bandage around the knee. The young man got well, and, what is still more rare, without anchylosis; he walks as if he never had had anything the matter with his leg.

For about five weeks, M. Nélaton had no reason to regret the course of treatment he had adopted. Every day, an injection of the tincture of iodine, almost pure, was thrown into the articulation, into which several incisions were made, so that the whole cavity might be thoroughly washed by it. Of course, the limb was kept, all the time, immovable. Under the influence of this treatment, the general symptoms of the patient greatly improved, and the suppuration at the joint diminished so much, that not more than two teaspoonfuls of pus were discharged in the course of twenty-four hours. Just at this time, when there was most reasonable expectation of the recovery of the patient, a vast abscess made its appearance in the posterior portion, the calf of the leg. A diarrhœa commenced about the same time; there were five or six liquid stools every day; ulceration of the intestines was to be feared. The patient became extremely emaciated, feeble, and a prey to fever. An unpleasant complication showed itself—a diphtheritic inflammation of the mouth; the gums, roof of the mouth, &c., were covered with a white layer of false membrane.

This patient would die in a few days, if nothing were done for him; there was great probability of death, even after the amputation of the limb, but without that, there was certainty.

The amputation would be so performed, by making the section extremely oblique, that the soft parts on the anterior face of the thigh would cover the wound. By this method, which is that brought into use by M. Sédillot, the liquids cannot accumulate against the posterior portion of the flap. Sometimes, after an amputation, under similar circumstances, M. Nélaton said he had seen the diarrhœa cease, as if by enchantment.

The operation was performed, but on the third day the patient died, after symptoms of purulent infection.

As to the condition of the knee, as might have been expected in an articulation in which the pus had long remained, the extremities of the bones entering into its composition were completely deprived of cartilage. The general symptoms in this case, M. Nélaton said, were the consequence of the formation of the vast abscess in the leg.

May, 1853. A man, forty-two years of age, was sent to the hospital as laboring under encephaloid disease of the knee. His affection, however, was in reality hydrarthrosis, but such a case as is very rarely met with.

In the course of his life, he had had several attacks of sickness, but none which were interesting in relation to the affection he was then laboring under. For the last twenty years, he had been subject to rheumatic pains, but never had had any swelling of the articulations. About three years before, a tumor about the size of an egg made its appearance on the internal side of the knee; but it did not affect the articulation. Three weeks before coming to the hospital, the limb about the knee became enormously enlarged, attended with heat and œdema of the whole leg and thigh; the patient said he had *lancinating* pains in it, but the surgeon must be guarded against this expression.

The volume of this tumefaction, when the patient entered the wards, was enormous; on the sound side, the calf measured, in circumference, twelve inches and two-fifths; on the other, sixteen and two-fifths; the sound knee, fifteen inches and three-fifths; the other, twenty and two-fifths. The whole of the lower part of the leg and the foot was also enlarged, and the swelling extended one-third of the way up the thigh. Very evident fluctuation could be felt about the knee, in every direction, both transverse and lengthwise; transverse fluctuation in a limb should never be trusted, for it may be owing to a displacement of the muscles. A collection of liquid was found also in the knee, as certified by the characteristic shock experienced on depressing the patella; and these two collections, in the knee and in the limb, communicated with each other. Beside the existence of a liquid in the articular cavity, there were other things to study. On moving the joint, a sensation was experienced, telling at once of the affection of the cartilage covering the bones. The cartilage loses its habitual smoothness, and appears to be formed of fibres, perpendicular to the surface of the bone, which have become separated from each other; it resembles velvet with a long nap. The ligaments of the articulation had given way, so that the bones could be pushed from side to side.

A case similar to this is very rarely seen, but there are cases occasionally met with, which are, as it were, *on the way* towards the condition seen in this. There had been, not very long before, a case in the wards, in which a tumor in the popliteal space communicated with an effusion in the joint, and also another, in which there had been rupture of the synovial membrane and effusion into the thigh. Here, M. Nélaton thought, there had been rupture and effusion into the muscles of the leg.

In the treatment of the case, M. Nélaton said, he did not think that rest and resolutive applications could effect much. He was disposed to make a puncture, and, after evacuating the liquid, to exercise compression upon the whole limb, by means of a circular bandage. This puncture could be repeated, if necessary, in a few weeks, or a month. Perhaps, he might go still further, and inject iodine; he feared, however, to inject so large a sac, and would, at all events, endeavor first to reduce its size by compression. By the evacuation of the liquid, the pressure upon the veins would be diminished, and the œdema of the foot and lower part of the leg would disappear.

M. Nélaton thought that there was no disease of the bones in this case, because, on both sides, they were of the same size. When a limb is swollen, if the bone be examined by the touch, it always appears larger than it really is; when the stump of an amputated limb is examined, the bone always appears larger than on the opposite side.

About a week after the patient's entrance to the hospital, a puncture was made into the vast effusion in the calf of the leg, and one pint and three-quarters of a clear, viscous liquid, resembling syrup, was extracted. Compression, by means of a well applied circular bandage, was then exerted upon the parts. By this puncture the knee was not completely emptied, so that there was some doubt as to whether a communication really existed between the liquid in the articulation and that effused in the leg. Some days afterward, however, a trocar was passed into the joint, and, as exactly the same liquid came away, a communication was believed to exist, but through a hole so small that one cavity could very easily be emptied without the other.

Although compression was made use of to prevent it, the liquid was again effused; M. Nélaton, therefore, made a second opening into the collection in the calf of the leg, and evacuating the liquid, he threw in an injection of iodine. Very little inflammation followed this operation; although there was again some effusion, the leg was much diminished in size, and the patient no longer complained of the lancinating pains, as he termed them, though they were in reality pains from cramps in the muscles. An injection of iodine was afterward made into the articulation itself, and with an excellent effect there also. The effusions which followed these injections, gradually, though slowly, were being absorbed, when in August, during the vacation, the patient left the hospital.

In the two cases which follow, the effusion in the knee-joint was owing to syphilitic affection in the neighborhood. At least one other similar case will be found elsewhere, under the head of syphilitic tumors developed in the cellular tissue; these are inserted here on account of the great importance of the diagnosis.

January, 1853. A young man, apparently in excellent health, who, six months before, had commenced to suffer pains about the knee. These pains were not constant, nor did they manifest themselves at any particular time. About three months after they commenced, he noticed that the knee was swollen. For three weeks, he treated this swelling himself by emollient poultices, without any good effect, and then applied to a physician for advice, who gave him a black ointment that produced vesication.

When he came to the hospital, the projections at the joint could no longer be distinguished; the whole was uniformly rounded. The presence of fluctuation was easily determined. There was certainly liquid in the articulation; it was a case of hydrarthrosis, but, with determining that, so far nothing was determined; and it was precisely on that account, M. Nélaton said, that he called attention to this patient.

This is what could be recognized. Above the articulation, toward the inferior portion of the thigh, in front, just at the spot where the synovial membrane abandons the triceps muscle, a tumefaction was found. It was easy to perceive that this tumefaction, or tumor, was situated beneath the muscles; for when the triceps muscle was contracted, the tumor could be felt at the sides, and the contracted muscle could be felt over it, in the middle. The tendon caused a depression, and it became more projecting at the sides. Further down the thigh, toward the joint, it was found to be situated also beneath the synovial sac, which is extended up the thigh, under the triceps muscle; for, by the touch, an interposed layer of liquid could be felt.

The cause of this young man's affection was evident from his history. Four years before, he had had a chancre, with indurations in the groin, followed, in the course of a year, by roseola, sore throat, and alopecia. The present affection was a tertiary symptom of constitutional syphilis; it was a gummy tumor, developed in the cellular tissue, under the anterior muscles of the thigh. M. Nélaton did not think it a bony tumor, an exostosis, because it was painful on pressure, and when he walked a good deal; and, moreover, it was accompanied by nocturnal pains, which are, so to speak, proper to bony tumors, no matter what may be their cause. This gummy tumor, from its situation, had produced a subacute inflammation of the articulation.

To cure the patient, it would be necessary to attack the general cause by a mixed treatment—the iodide of potassium, and the protiodide of mercury.

This patient was well in about four weeks.

March, 1853. A man entered the hospital, from whom it was very difficult to obtain any information as to the history of his case. He had unquestionable signs of constitutional syphilis; and yet he denied ever having had any primary affection. On the head of the penis, however, on the right side, near to the meatus urinarius, a small spot was found, more white than the parts around, and there was also another similar spot on the frænum. These spots, M. Nélaton thought, were the cicatrices of chancres, which the patient had allowed to pass, unperceived.

This patient had an affection of the knee; it was enlarged and rounded, and some liquid could be detected in the articulation, though not any very considerable quantity. This affection, although the effusion was not great, was accompanied with acute pains about the joint. The limb was in a state of extension, showing that the distension was not great.

M. Nélaton believed the origin of this affection to be syphilitic. In fact, on several bones, and particularly upon the subcutaneous face of the tibias, exostoses were found. Some authors profess that syphilitic exostoses occupy, principally, the superficial faces of bones; but this M. Nélaton believes to be erroneous. The longer complained of the lancinating pains, as he termed them, though they were in reality pains from cramps in the muscles. An injection of iodine was afterward made into the articulation itself, and with an excellent effect there also. The effusions which followed these injections, gradually, though slowly, were being absorbed, when in August, during the vacation, the patient left the hospital.

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February, 1852. A young man, sixteen years of age, with an affection of the knee, for which an amputation of the thigh was demanded.

When but four years of age, he had had a fall, which forced him to keep his bed for several days, and he said that, at the time, there was a considerable swelling of the knee. This disappeared, but many years afterward; that is to say, three years and a half before coming into the hospital, the same knee became enlarged and painful, and he entered the wards of M. Blandin, at the Hôtel Dieu. There, blisters were applied, and deep and broad cauterizations were practised. It is extremely rare that one cauterization is sufficient, and before the introduction of chloroform, on account of the pain, they could not be made use of so freely as they can now. As a general rule, from two to six different cauterizations are required. He left the wards in about the same condition as that in which he had entered. Afterward, he had a fall, and since then his limb had been thrown out from its normal direction.

There was, at the time this patient entered the hospital, a difference of development in the two limbs, seen in every portion, the muscular as well as the osseous. In the tibias, for example, the difference was as much as four inches. The superior extremity of the tibia was under the external condyle; its inferior extremity was abducted, and, moreover, the limb was rotated outwards. Over the projection formed by the fibula, and the external portion of the head of the tibia, was a fistulous orifice, leading into the articulation, which was filled by articular fungosities. There was nothing to be done here, but to amputate the thigh.

The method which M. Nélaton practised was, as usual, the circular, so modified, that the incision is made very obliquely, in order that the anterior portion of the flap may cover the whole wound.

The examination of the amputated joint was exceedingly interesting. In the upper part of the tibia was an excavation, lined by a membrane, and filled with a sero-purulent liquid. This excavation communicated with the articular cavity by a perforation. This excavation, M. Nélaton said, had been formed by a deposit of tuberculous matter; little by little, this mass had grown larger, and a loss of substance had been channelled into the osseous tissue, until, by degrees, it had opened into the articular cavity, there occasioning violent inflammation. These deposits, when they form near a joint, open into the articular cavities rather than externally, because there is no periosteum there, and reparation of bone is never seen where there is diarthrodial cartilage. Their opening externally is opposed by a continual deposit of new bone.

This patient died of purulent absorption.

In May, 1853, there was a case in the wards, which is interesting in connection with the one immediately preceding.

A man entered the wards, complaining of great pain in the head of the tibia. Iodide of potassium had been given to him for some time, but without any benefit, when *suddenly* an effusion took place in the joint. This might have been owing to several causes, but M. Nélaton was disposed to believe it to have been caused by the opening of a tuberculous cavity into the articulation. It is well known that patients, who have tubercles in the lungs, can be suddenly seized with pain, and violent inflammation of the pleura, which are found afterwards to have been caused by the perforation of one of the tuberculous cavities. Now, that which is known to take place in the pleura, can likewise take place in the synovial membranes.

The friends of this patient removed him from the hospital, and I do not know his further history.

May, 1852. M. Nélaton performed the amputation of the thigh, upon a man with a white swelling at the knee.

Four years before, he had received a kick from a horse, on the anterior part of that knee, the pain from which, three or four days afterwards, forced him to leave off working, and send for a physician. Blisters were applied about the joint, and he soon was able to resume his work. Although he always limped a little, he continued to work for two years, when he received a fall, and, after that, very serious inflammatory symptoms commenced. Cauterizations were made over the knee, but the disease progressed, and he then came to the hospital.

At the time he entered, the knee was enormously swollen, and this tumefaction was caused by fungosities developed in the synovial tissue, for, by the touch, the existence of a softish, but not fluctuating tissue, was detected. Another characteristic of fungosities also existed, which is found, at least, in a certain number of these cases; this tissue, formed by fungosities, is a sort of erectile tissue, suspended in a softish, gelatiniform tissue, and thus to the touch pulsations are perceptible, and when it is pressed, it yields, and, by degrees, resumes its former shape.[1] This pulsation may make the surgeon believe in the existence of an encephaloid degeneration. It is not constantly found in fungosities, nor, in fact, in the encephaloid tissue either.

The reduction of this tissue was sought to be obtained; cauterizations were practised, and, for four months, the knee was covered with suppurating tracts. There was an amelioration, but, without any apparent cause, the knee again became aggravated. This time, recourse was had to injections of iodine into the articulation. The consecutive phenomena were quite simple, and, under the influence of this treatment, there was considerable improvement; but a second time M. Nélaton's hopes were disappointed, the patient again becoming rapidly worse.

His knee was then enormously swollen, and the articulation was filled with fungosities, and with an accumulation of pus, which could be made to come out from several fistulous orifices. The patient's complexion was bad, and he was exceedingly emaciated; his condition was very serious, and he evidently would soon not have sufficient strength to support an operation, which M. Nélaton said he performed, less on account of the knee itself, than on account of the general condition of the patient. In the posterior portion of the thigh, there was an abscess which extended as far as the middle of the limb. This, M. Nélaton said, was of no consequence, and would not retard the cure the least in the world; it would be cut in two, and the upper portion would be left in the stump.

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[1] Fungosities are composed: 1st. Of granular amorphous matter, often very abundant, particularly when they are very soft; 2d. Of fibro-plastic elements; 3d. Of fibres of cellular tissue, crossed in every direction, and rarely in fasciculi; 4th. Of capillaries, more or less abundant; 5th. Sometimes granular globules of inflammation, or even globules of pus, on the surface only, of the tissue.

The operation practised was the one usually performed, circular, but having the anterior portion of the flap sufficiently long to cover the bone. Fifteen ligatures were used. In dressing a stump, after an amputation, it should be mentioned that, very often, M. Nélaton applies what he calls a *provisional dressing*, merely dry charpie confined by a bandage, and at the end of an hour, he applies the other. He considers it of great advantage in the prevention of consecutive hemorrhage.

It was sought, in this case, to guard the patient against purulent infection, by means of the administration of strong wine, in addition to that which enters *naturellement*, as M. Nélaton expresses it, into the diet of the patients. Unfortunately, it could not be taken by the patient, who said that it made him sick at his stomach.. At the expiration of a few days, he had attacks of vomiting, and about the same time he had chills with fever, the commencement of the symptoms of purulent infection. The tincture of aconite was then prescribed, but it could only be given very imperfectly, for the patient always vomited at the end of five or ten minutes after swallowing. At last, he had pain at the elbow, followed by signs of purulent collection in the joint, &c., and died.

At the autopsy, the crural vein was found to contain a large quantity of pus; *its extremity was closed by a fibrinous clot, so that the absorption of the pus from the surface of the wound could not be admitted.* In examining the lungs, the liver, and also the spleen, where these alterations are less frequently seen, small abscesses were found disseminated through them. In most medical works, a great mistake is made, M. Nélaton said; it is stated that, in these organs, the pus is found *deposited;* but it is always *formed there after a preceding inflammatory action.* The first thing that takes place, is vascular injection; small ecchymoses, indurated spots, are found; and, if divided, small portions of tissue are seen to be hepatized; it is only after some days that pus is formed, with traces of inflammation around it.

As the propriety of tying an artery in a suppurating wound is doubted by some, it may be stated that, here, a very fine thread was tied firmly around the crural artery very near to its extremity, when it had been bathed in pus for ten days. The internal tunic and the middle were divided, but the external, as usual, resisted.

July, 1853. The amputation of the thigh was performed, in a case of white swelling at the knee, upon a girl, aged fifteen. Of course, the operation was a last resource; the disorganization about the articulation was very great; the ligaments were loose, and pus was formed and discharged from fistulous orifices in large quantity. For three weeks, a striking change for the worse had been steadily progressing, and the amputation of the limb could no longer be delayed.

The circular operation was performed, with the modifications usually practised by M. Nélaton, the section of the soft parts being made so oblique, that the incision anteriorly shall be much nearer the knee than posteriorly. In this way, behind, the flap remains about the level of the bone, while, in front, it falls much over it. This prevents the danger of an accumulation of putrid pus, which so often takes place after amputation of the thigh, and, moreover, the cicatrix, instead of being placed directly over the bone, will be placed behind, and there is thus less risk of consecutive alterations in the cicatrix.

This patient died, on the eighth day of the operation, with symptoms of purulent infection, though with no decided signs of the formation of pus in any of the internal organs.

At the autopsy, a phlebitis was found; the iliac vein contained what was plainly a mixture of blood and pus, and without having been rubbed and fingered. Further down, towards the extremity of the stump, the vein was filled by a coagulum adhering to the walls. Here also it was shown that an artery in the centre of a suppurating wound can be tied just as well as another; the coats of the vessel had not been at all softened.

The femur was the type of a commencing acute inflammation of bony tissue. There was pus in the medullary canal, but that was not all—there were small purulent collections disseminated everywhere in the osseous tissue itself. Eight days before, there had been nothing of the kind, and the specimen showed the march of acute osteitis—in eight days a femur full of pus. There is a great difference between this change, and that described by M. Nélaton as tuberculous infiltration; while here, the cellules filled with pus were surrounded by parts inflamed in various degrees, in the latter, the spots were circumscribed, with no traces of alteration around them. In researches on the pathology of bones, those of both sides should always be examined; above all, in patients at about the age of this girl, for then the appearance of the bone is changing.

The uterus of this patient was turned towards the right side, and the upper part, at the union of the neck with the body, was bent directly forwards.

Anchylosis of the Knee.

July, 1853. A young man, about twenty years of age, stoutly made, entered the wards on account of an anchylosis of the right knee.

Two years before, in New Orleans, he had been seized with intense inflammation of that articulation; it was the only joint affected. The arthritis was very intense, and when asked, the patient said that, at that time, he was in the fifth or sixth week of a blennorrhagia. Treated by leeches, blisters, and frictions with mercurial ointments, the phenomena of acute inflammation passed away, but it was two months before he ceased to suffer constant pain. At that time, however, when he wished to walk, he found his limb in a most vicious position; it was flexed at a right angle. By degrees, this angle had become obtuse, and the leg was in this position when he came to Paris to have the deformity rectified.

Beside the flexion of the leg, there were two other displacements, almost always seen in these cases when they have lasted some time; one, the abduction of the limb; the other, its rotation on its axis, in such a way, that the point of the foot is turned outward. There was no more effusion in the knee-joint, no articular fungosities, nor any deformity of the bones. If the affection had been a white swelling, all symptoms of it had gone.

The femur being fixed, the tibia could be slightly moved in extension and flexion; the movement being, at most, three or four degrees of a circle. The patella was situated very low, and not only that, but it had passed outward upon the external condyle of the femur; a displacement easy to understand, for, being attached to the tibia by ligament, it must follow that bone in a change of position. Its mobility, it was very difficult to determine; placed where it was, upon an angle of bone, a lateral movement should have been very easy; scarcely, however, with some force, could a barely perceptible movement be produced. M. Nélaton, however, believed in its mobility, and that it was attached, not by bony tissue, but by fibrous bands.

In the consideration of the propriety of undertaking an operation for the straightening of this limb, which was what the patient desired, there were some favorable circumstances; the patient was young, and the disease to which it was owing had been acute; and it is in cases following acute diseases, and occurring in the knee-joint, that the finest cases of straightening have been seen, as will be found by consulting the work of M. Bonnet. An unfavorable circumstance, here, was the duration of the disease for two years, but in M. Bonnet's work are some cases reported, where the affection had lasted more than two years.

This anchylosis was of such long standing, that it would have been vain to hope to overcome it by means of baths, frictions, &c.; it was necessary to have recourse to the employment of some machine. The machines, used for this purpose, are of two kinds, some acting slowly and gradually, while others break the adhesions suddenly and rapidly.

Some years ago, M. Louvrier had a very ingenious machine constructed, for the purpose of breaking, at one sitting, all the articular adherences, whether bony or fibrous, and reported many cases in which the straightening of the limb had been effected by it. M. Bérard, Jr., was appointed to make a report on the subject to the Academy of Medicine; and from the results of his inquiries, it is to be concluded that, instead of being applicable to all cases of anchylosis, the sudden and rapid straightening of the limb is suited to but very few. One objection was the violent pain it causes; but this objection is now of no weight, for chloroform can be administered to the patient. Again, in cases in which the patella was not all—there were small purulent collections disseminated everywhere in the osseous tissue itself. Eight days before, there had been nothing of the kind, and the specimen showed the march of acute osteitis—in eight days a femur full of pus. There is a great difference between this change, and that described by M. Nélaton as tuberculous infiltration; while here, the cellules filled with pus were surrounded by parts inflamed in various degrees, in the latter, the spots were circumscribed, with no traces of alteration around them. In researches on the pathology of bones, those of both sides should always be examined; above all, in patients at about the age of this girl, for then the appearance of the bone is changing.

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and, in consequence, M. Nélaton decided to employ his method for loosening the patella.

As regards the section of the contracted muscles, situated behind the articulation, in order to straighten the limb, after the position of the patella has been overcome, there are some very important points to be attended to. The external popliteal nerve there, is situated alongside of the biceps, and, in one case, M. Bonnet, in making the section of that muscle, divided with it this nerve, and the foot was deprived of the power of supporting the body. In some cases, again, neuralgic pains have followed, so violent, that the patients have regretted having submitted to the operation. There are three methods for performing the section of this muscle: that of M. Palatiano, that of M. Bonnet, and the method of Dieffenbach. The first-named surgeon separates the biceps from the nerve, by pressure with the fingers, and then passing a long tenotomy knife under the skin, he cuts down to the femur. This method, however, is not without danger, for the superior articular artery has been thus divided, and a dangerous hemorrhage has ensued. In order to obviate this danger, M. Bonnet attacks the muscle by its deep edge, so as to be able to cut from within outward; this method is better than the other, for the artery is not thus exposed to the edge of the knife; but it has some inconveniences, for the incision in the skin corresponds directly to the edge of the muscle, and there is not that long distance which should exist between the external opening in the skin and the wound in the muscle, and which should always be sought for in tenotomy, for without it deep-seated suppuration is liable to follow. For this reason, in place of making an incision behind the joint, one is made in front, a little above the condyle of the femur, and the knife is then conducted towards the fore-finger of the left hand, placed as much as possible between the external popliteal nerve and the muscle, which is then divided by a saw-like movement of the instrument pressed from within outward. By this last method, the artery is avoided, and there is no risk of having air introduced into the wound.

When these sections have been made, the surgeon proceeds at once to make movements of flexion and extension, continued for four or five minutes, so as completely to break up the adhesions. Should the limb be at an obtuse angle, it can be straightened immediately, but if at an acute, the inflammatory symptoms following the violence must be previously combated.

Experience shows that, by this straightening of the limb, nothing is gained, so far as the movements of the articulation are concerned; the joint remains stiff, an angular anchylosis is transformed into a straight anchylosis, yet this is much preferable for the patient, and quite sufficient to warrant the operation.

The operation of cutting these tendons is a very delicate one, and M. Nélaton having never performed it upon the living subject, and a long time having elapsed since he had done so upon the dead, he repeated it a number of times upon the dead body, before performing it in this case.

When prepared to undertake the operation, M. Nélaton showed several specimens, in order to explain the operation he was about to perform. He would make two oblique incisions, after the method of M. Bonnet, so as to divide about two and a half inches of the muscular fibres in breadth; making them so high up as to avoid the prolongation of the synovial capsule of the knee, unless some anatomical peculiarity existed in this patient. Only the extensor tendons and some of the fibres of the strong lateral fascia, would be divided, and if, after that, the patella could not be loosened, every operation for the relief of the anchylosis would be abandoned.

Before being submitted to the operation, which is very painful, the patient was placed under the influence of chloroform. As soon as the extensor tendons were divided, the limb was flexed with facility, thus loosening the patella, and after making a few movements of flexion and extension, M. Nélaton left the patient in that condition, abstaining from straightening the limb, until the inflammatory symptoms, which would follow the violence, had passed by. Ice was afterward placed around the joint. When all danger of inflammation from this operation was past, the biceps muscle was divided by the method explained above, and then the limb was straightened without difficulty.

This patient left the hospital in November, about three months after his entrance. The limb was then perfectly straight, it did not seem, however, to be perfectly normal; the tibia seemed to be *a little* behind its natural situation below the condyles of the femur. The patella was perfectly fixed, and it was a question, M. Nélaton said, in his mind, whether this might not have been prevented; it was one, however, that could only be answered theoretically, for there are no facts to prove it. At some distance above the patella, where the incisions had been made, there was some thickening of the tissues.

The patient walked very well with a cane, and M. Nélaton said he would very soon be able to do without that.

April, 1854. A man, about fifty years of age, with anchylosis of the knee; the leg was at a right angle with the thigh, and almost motionless.

The cause of this position and this stiffness of the joint, existed, entirely, in the ligaments and tendons; the bones, the femur, the patella, and the tibia were perfectly healthy, and moved freely over each other as far as the other parts permitted.

This patient used, for a month, an apparatus, invented by M. Bonnet, to move the joint; and which is so constructed, that the patient is seated and operates on himself, by moving a cord which passes over a pulley and is made fast at the heel. By this a great deal was gained; and then, a great impediment to the further extension of the knee was found to exist in the tendons. M. Nélaton said he would divide the most prominent one first, and then, as the limb became more extended, new tendons would project, and as they came into notice, he would divide them.

The semi-tendinosus and the gracilis were divided at the first operation. It was done, by introducing a knife between the skin and the tendon, then turning the edge against the latter, and pushing until its section was felt to be completed. No bad symptom followed; on the second day there was a little ecchymosis, and nothing more. The day after the operation, M. Nélaton commenced to extend the limb, but with great caution; he only extended it once, and maintained the position but for a moment; the next day the same thing was repeated, the object being to prevent the immediate reunion of the divided parts. When there was no longer any danger of inflammation, the apparatus of M. Bonnet was again applied, and the patient recommenced his exercise.

The last time I saw this patient, the limb was very nearly straight. As to the divided muscles, they reunite, and act again very well.

In this case, the contraction of the muscles was supposed to be a symptom of tertiary syphilis.

CHAPTER IX.

POTT'S DISEASE, NECROSIS, AND EXOSTOSIS.

Pott's Disease of the Vertebral Column.

April, 1852. A young man, fat, and of healthy appearance, entered the wards, with what M. Nélaton prefers to call, as the name prejudges nothing as to the nature of the affection, *Pott's Disease* of the vertebral column. Other names, more precise, are, for that very reason, inexact, for the same anatomical alteration does not exist in every case. It is certainly true that, in the great majority of cases, the disease has its origin in tubercles of the vertebræ, but, on that account, the surgeon should not refuse to recognize, that, in certain very rare cases, the vertebræ present true caries, at other times, osteitis and necrosis, and that, in some cases, still more rare, perhaps, the intervertebral cartilages appear to have been the starting point of the disease.

This young man had, as symptoms of the disease, two abscesses by congestion; one on the right side, in the iliac fossa; the other on the left, in the neighborhood of the insertion of the muscles into the vertebral column, below the dorsal vertebræ. There was no gibbosity. A trocar was passed, in the groin, into the abscess on the right side, and about one litre, or more than two pints of pus, were extracted. This was followed by an injection of iodine, the proportion being, as usual, one of the tincture to two of water, with some iodide of potassium, to prevent the precipitation of the iodine; after remaining some time, it came out by the canula. No signs of inflammation followed this operation; at most, the patient complained of a slight increase of tenderness on pressure. At the expiration of eight days, by palpation, fluctuation was again detected, and the operation was repeated. Five times the pus was let out, and the iodine injected, the suppuration gradually diminishing, until there was none at all.

For several days, there was no discharge; the patient's general condition was most satisfactory, and he would have been said to be cured, but M. Nélaton thought it best to keep him in the wards, in order to see if the cure would be maintained. After a few days, the suppuration recommenced, showing that the surgeon must not hurry in determining the cure of these cases. The influence of injections of iodine, when there is an alteration of the bone, M. Nélaton said, had been much exaggerated.

Affections of the vertebral column, of two orders, present themselves to the surgeon; namely, with, and without sequestra. When a sequestrum remains in the bottom of the abscess, he cannot obtain a cure; when, on the contrary, a sequestrum does not exist, sometimes, not always, he can obtain it. Thus, when injections of iodine are used, sometimes cures are obtained. There is a formula of Boyer, "abscesses by congestion, without gibbosity, get well with more difficulty than when there is;" and this, which is true, is to be explained by what is known of the causes of this disease. As said before, the disease is, almost always, a tuberculous affection, and in the bones, as in the lungs, this presents itself under two very different forms; sometimes the tuberculous matter is contained in a cavity, or in cavities, hollowed out of the osseous tissue; sometimes, it is infiltrated in the cells of the spongy portion of the bone affected.

In the first form, the small tuberculous mass first deposited, gradually increases in size, and in proportion as it does so, the osseous tissue disappears without leaving the least trace. This is the essential character of this variety of the affection, the production, in the bones, of excavations, a destruction of tissue, without leaving any residue. How this destruction of tissues takes place is not known; the principal circumstances attending it can only be pointed out, without prejudging anything as to its intimate nature. It seems to take place without inflammation, by the fact of the deposit of the tuberculous matter, and from the pressure it exercises on the bone. The explanation of the fact, however, is not here the important point, it is its establishment.

By degrees, the destruction of bone is so great, that nothing but a shell is left, so thin that, unable to sustain the weight of the parts it supports, it gives way. The part of the column, placed above the excavation, inclines forwards upon the inferior part, the spinous process of the crushed vertebra becomes more projecting backward, and the gibbosity is thus produced. Sometimes, though it is not usual, the vertebra gives way suddenly. M. Nélaton related two cases of this kind, that had come under his own notice; one, of a young girl, where it happened while she was dancing, and another, of a wine-merchant's boy, who, at the time, was coming up a ladder from the cellar, carrying in each hand a large bucketful of wine. In these sudden, instantaneous cases, there can be no doubt as to the variety of the tuberculous affection; there is no sequestrum, and a cure may be had, of course, with deformity.

In the other form of tuberculous affection of the bones, the tuberculous matter is infiltrated into the cells of the spongy tissue, either in the form of spots of a gray, opaline tint, followed by puriform infiltration, or the puriform infiltration takes place at the first. The puriform infiltration is distinguished by the pale yellow, completely opaque color of the matter in the cells, which, at first quite firm, gradually softens and becomes puriform. The bony tissue becomes necrosed as soon as it is affected with puriform infiltration; no vessels, no signs of the persistence of vitality can be perceived, and a sequestrum is formed.

In this form of tuberculous affection, it often happens that the disease, although of very long standing, does not give rise to gibbosity; at other times, it takes place long after the commencement of the symptoms that indicate its formation. Three causes concur to produce the gibbosity: the destruction of the intervertebral fibro-cartilages, the wearing away of the bodies of the vertebræ, and the separation of necrosed fragments of bone.

Almost all the bloodvessels that supply the intervertebral cartilages, reach their superior and inferior surfaces after having traversed the osseous tissue of the vertebræ. This anatomical fact explains why, if only one lateral half of the body of a vertebra be affected, the intervertebral disk is only destroyed in the half which corresponds to the altered bony tissue; if the body of only one vertebra presents this infiltration, the destruction does not extend to the whole thickness of the cartilage; it is limited to the part in contact with the infiltrated osseous surface; there is the closest relation between the puriform infiltration of the osseous tissue and the destruction of the fibro-cartilages.

When one of them is placed between two vertebræ affected with puriform infiltration, it dies, and is then destroyed by a mechanism analogous to destruction by maceration.

When the cartilage is destroyed, the bodies of the vertebræ come into contact, and rubbing against each other, the necrosed osseous tissue wears away. To recognize this condition of things, by rubbing the pus, coming from the parts, between the fingers, the hard, bony dust can be felt. The deformity, in this case, must take place slowly and gradually.

When, therefore, the gibbosity appears long after the first appearance of symptoms of an affection of the vertebræ, the chance of cure is very small, for there is always, then, necrosed bone. This patient, who, for several days, seemed to be cured, soon became rapidly worse, and died from the excessive suppuration, in the month of June, three months after his entrance. At the autopsy, a huge purulent cavity was found in the right iliac fossa, and extending up along the vertebral column as far as the last dorsal vertebra. In the last dorsal, and also in the first lumbar vertebra, was a larger cavity, which contained a hard portion of bone; the sequestrum was smaller than the cavity. This difference in size was not owing to the diminution in size of the sequestrum, but to the gradual enlargement of the cavity. As to the dissolution of necrosed bone, M. Nélaton does not believe it; he made the following experiment: he cut out, by a trepan, a piece of bone from the tibia of a dog, and after allowing it to remain a short time in boiling water, he replaced it, and covered up the wound. The dead piece of bone never diminished in size; it had always exactly the same volume. This fact, that necrosed bone does not disappear, makes the prognosis in many cases of Pott's disease, very serious; for all injections, all medicaments, are powerless, when there is necrosed bone.

The fibro cartilages between the vertebræ were almost intact. In one testicle, there was a mass of tuberculous matter; in the other, were what M. Nélaton called, tubercles in the state of gray granulations.

A few days before the death of the patient, whose case has just been related, a boy, fourteen years of age, with the same affection, came to ask advice.

Fifteen months before, he began to have pains in the back; they increased so much, that after some time he made up his mind to enter a hospital. He went to Sainte Marguerite, where, under the idea, perhaps, that these pains were rheumatic, cups were applied to the lumbar region. Through them, and the rest in bed, he got better; and leaving the hospital, he continued to work for twelve months. The pains in the back became again so troublesome that he entered M. Nélaton's wards.

In the lumbar region, on the right side, at the external border of the common mass of the spinal muscles, a tumor was found; the projection formed by it was very small; it was firm to the touch, and fluctuation was not very evident in it. Believing this to be but a portion of a tumor concealed in the abdomen, M. Nélaton asked the boy to cough, and the swelling became at once much larger. When in front, on the same side, pressure was made upon the abdomen, a body was displaced, that slipped in the direction of the umbilicus, and resumed its situation as the fingers were withdrawn. More deeply still, something was felt which filled the iliac fossa; that part was not so hollow as it should have been. This swelling in the fossa communicated with that in the back; by placing the patient on his back, one hand being upon the tumor in the lumbar region, by pressing with the other hand on the tumor in the iliac fossa, the other was felt to fill up. As to the tumor, first displaced by palpation, in the abdomen, M. Nélaton thought, for a moment, that it might be the kidney; but it felt much smaller than the kidney, and *always, to the touch, tumors of the abdomen seem to be larger than they really are.* He believed it to be formed by matters contained in the cæcum or the ascending colon.

Here, then, there had been lumbar pains, followed by the formation of an abscess; there could be no doubt that there was an affection of the vertebral column, and that affection a *tuberculous infiltration.*

M. Nélaton decided against opening this abscess by congestion; he said it would be rather injurious than otherwise. The young man, who was then in the wards, had entered *embonpoint*, and apparently in excellent health; three months before, his abscess had been opened, and although an apparent cure had followed the iodine injections, the suppuration had recommenced, and he was rapidly sinking.

This boy, therefore, left the wards in a few days, without receiving any treatment other than what was simply hygienic.

June, 1853. A boy, fifteen years of age, perfectly well-made, but not larger than a boy of eleven. His complexion was clear and rosy, and the boy himself was animated. Nevertheless, he was laboring under a scrofulous affection, as M. Nélaton termed it.

Fifteen months before, he had commenced to have pains in the lumbar region; he continued, however, his usual occupations. Three months previous to entering the hospital, a tumor made its appearance at the superior and internal parts of each thigh.

In examining the lumbar region, it was found to be *straight*, and a gibbosity was found in the lower part, at the spinous process of the fifth lumbar vertebra. Normally, the lumbar region is concave; and hence the spinous processes of the vertebræ do not project; when the body of one of the vertebræ gives way, then it becomes rectilinear, but it does not make a projection posteriorly, as in the dorsal region.

On the right thigh, between the sartorious and the middle adductor muscles, was a tumor, fluctuating, and disappearing when the pressure made upon it was sufficiently great; it emptied itself into the abdomen, for, one hand being placed in the iliac fossa, the liquid could be felt to enter, and it could be again pushed out. On the left side, there were three tumors; one in the triangle of Scarpa, another at the anterior and internal part of the thigh, and a third was posterior; all were fluctuating, and communicated with the abdomen. The great size of these purulent collections was most remarkable.

The prognosis in this case, M. Nélaton said, was most unfavorable; the *immense* probability, to use his expression, was that it would terminate fatally. Until the present time, the boy had always an excellent appetite, good health, and was active and lively. It was best not to leave him to die, but to profit by his youth and health. Iodine injections afford a good method of treatment, though they are not infallible, as some surgeons would pretend. They are useful in some cases, while others are intractable to any treatment; what these cases are, requires some explanation.

The affection the patient was laboring under, was Pott's disease of the vertebral column, a *tuberculous* affection. Some persons dwell upon the word *tuberculous*, but what M. Velpeau says of the testicle—and this M. Nélaton said he believed himself—is true also of the bones. In some cases of affection of the bones, all the symptoms are those of acute inflammation; others have all the characters of the scrofulous. Of this affection, there are two forms essentially distinct; one could be benefited by injections, the other could not. In one, the tubercle is deposited in the bone, which, when it is removed, looks exactly as if a trepan had been applied, and the parts all around it are healthy. The osseous tissue, in the neighborhood of the deposit, is red *and inflamed*, it is said; but the spongy tissue of the bodies of the vertebræ is always red at every age. It is not the same, at *every* age, in other bones; the spongy part of the head of the humerus, for instance, is yellow in the adult, while, in the child, it is red. This, then, an excavation filled with tubercular matter and surrounded by an enveloping membrane, is the first form of the affection, and it is the most favorable; cure can take place in it.

In the other form, there is an infiltration of tuberculous matter; here, there is no cavity, the deposit is made in the cells of the spongy portion of the bone. The osseous tissue, thus infiltrated, undergoes changes, and at last dies.

Now compare these two cases; in one, the walls of the cavity can come in contact, and cure can result; in the other, there is a sequestrum. In an abscess in the first, you make an injection in a cavity disposed to heal up; in the other, no earthly power can cure it.

But, the surgeon should go further, and endeavor to diagnosticate these cases. Sometimes, it is possible to do so. Suppose a case of the first form of the disease; the vertebra made thinner and thinner, a moment comes when it gives way suddenly, the bony projection is produced at once. At other times, it yields more gradually as it becomes thinner; but always, in this form, the gibbosity is rapidly produced. Two or three months can be considered a short time for its production.

When the tubercular matter is infiltrated, the formation of the gibbosity is very, very slow. In this form, the disease is rarely limited to one vertebra; when two, contiguous, are affected, the intervening fibro-cartilage, deprived of its means of nutrition, must die. Gradually and slowly it disappears, and the two bones, at last coming in contact, will wear each other; they can become angular, worn away, anteriorly, to a thin edge. The osseous portions, in a pulverulent state, will be found in the neighboring suppuration.

If the two forms of the disease are well isolated, if they do not complicate each other, they may be thus diagnosticated.

To return to this boy; in his case, from the want of details, it was impossible to tell by which form he was affected. No one, but a physician, can determine the existence of a gibbosity in the lumbar region, and the boy could not tell when his deformity had appeared. Nevertheless, M. Nélaton said, it was not a case where the surgeon should fold his arms and wait for events; if there was no sequestrum, the evacuation of the pus contained in the tumors, and the use of iodine injections, might be of immense service to the boy; if there was a sequestrum, they could do no harm.

The operation was deferred for a few days, on account of an attack of varicella, with which the boy was seized. To make the puncture on the left side, M. Nélaton chose the abscess on the internal part of the thigh; he pushed the trocar in, but no pus came out. He had desired to make the puncture in the lowest part of the collection, and passed beyond its lowest limits, entering the muscles. A second puncture penetrated the abscess, from which an enormous quantity of pus issued. The sac was completely emptied of its contents before the iodine injection was used, for when such a cavity is only half empty, the injection acts on the pus, and you do not have the result you desire. Two syringefuls, the ordinary syringe used in operating for the cure of hydrocele, of the usual injection, were thrown into the sac. With great difficulty, after having allowed the injection to remain about five minutes, one syringeful was made to come out.

At three o'clock in the afternoon, about four and a half hours after the operation, the boy was seized with vomiting, he became very uneasy, he groaned, the skin was covered with sweat, the respiration was quick, the extremities cold, and the pulse small and thread-like. These symptoms persisted until nine o'clock in the evening, when he was in the same condition, except that the pulse had improved; at that time, the pupil was dilated, and almost insensible to the light, and the eyelids were œdematous. The next day, he seemed to be suffering a great deal, but would scarcely answer a question; the eyelids were much swollen and bluish; the eyes seemed slightly projecting; he complained constantly of soreness in the throat, but there was no extreme dyspnœa. The third day, the boy moved more about his bed, and could sit up in it; the breathing was very much oppressed, the difficulty being in inspiration; nothing was wrong, as far as could be seen, in the mouth, except that the parts were dry, as might be supposed; the *cough* was croupal; the *voice* was not much affected—a child with croup, speaks by the mouth, there is no laryngeal vibration, no voice, properly speaking.

The cause of these symptoms was, manifestly, *intoxication* produced by the iodine; there could be no doubt on the subject. When an animal is poisoned by iodine, the same thing is seen, the predominance of the symptoms towards the upper portion of the alimentary tube and of the larynx.

In a case of the same kind which had occurred before in the wards, after a large dose of the iodide of potassium, an emetic was at once administered, but here none was given, for already there was too much vomiting. As, after the injection of iodine, it is found in the stools, croton oil was given to purge the patient. Small blisters were also applied to the sides of the neck. In case the difficulty of breathing should increase, M. Nélaton had everything prepared to perform tracheotomy.

These symptoms gradually subsided, and six days afterward, they had entirely disappeared, though there still remained a feeling of soreness in the pharynx. The purulent collection on the right side was then emptied, and an injection of iodine made; this was made to come out without difficulty.

This injection of iodine was followed by an effusion of liquid in the old purulent cavities, which became even more distended than they had been before. By degrees, this consecutive effusion was absorbed, and there was but very little of it when the boy left the hospital. In the month of March, 1854, I saw him, perfectly well; he was completely, entirely cured.

The case of iodic intoxication, above referred to, as having occurred a short time before in the hospital, was in a woman, who had a tumor in the mammary gland, and there being some doubt as to its nature, it was decided to try the iodide of potassium. One gramme, or sixteen grains, was given in the morning, and, in the course of the day, she was seized with the symptoms of œdema of the glottis, as it is called, though it is rather an œdema of the vocal ligaments. There was great dyspnœa, with the peculiar character of œdema of the vocal ligaments, the inspiration being made with great difficulty, the expiration being easy. The woman also complained of pain in the head, as well as of pain toward the bottom of the throat. There was œdema of the eyelids, from serous infiltration into the conjunctiva.

An emetic of tartarized antimony with ipecacuanha was administered, and instruments were had in readiness either to scarify the ligaments, or to open the trachea, should a paroxysm of suffocation occur. In her case, however, the symptoms soon subsided, and did not last more than twenty-four hours.

Symptoms of coryza, of pain in the frontal sinuses, of sore-throat, or of salivation, are very frequently seen, after the administration of iodine; and from these symptoms of irritation and œdema in the upper part of the throat, to those of œdema of the upper part of the larynx, there is but a step.

March, 1854. A young woman from the country, twenty-three years of age, who, although apparently in excellent health, had a serious, very serious affection.

She said that, three years before, she had received a violent fall, from the slipping of her foot on ice, in which the posterior part of the pelvis struck the ground. Severe pain in that part of the body followed this injury, which continued for several days to such a degree, that she was unable to sit down, although she was never forced to give up her usual occupations about the house. Soon after, she became pregnant, and then, although she had pains in the pelvis, she could not say whether they were owing to the blow or to the fact of being pregnant. There was no difficulty in the delivery. Not long after her confinement, she had what she called a *fluxion de poitrine* (the common name of peripneumonia), but it had not obliged her to keep her bed.

Examining this patient in the iliac fossa of the left side, a large tumor was found filling it completely; and it went up above the crest of the ilium, and passing downward under Poupart's ligament, descended five or six inches below it. This tumor was rounded, and quite firm, but, *in its whole extent*, it was fluctuating. The fluctuation could easily be felt in the iliac region; in the groin, or the thigh, it was more difficult to detect. There was, moreover, in the left buttock, a tumor presenting the same characters as the other. The skin, covering these tumors, was perfectly natural.

These tumors were liquid, the liquid was pus, and the question, about which there were some doubts, was, where this pus came from. Particular inquiries were made in regard to the fall the patient had had three years before, for all patients have a great tendency to attribute their diseases to some exterior injury. Here, it appeared to have commenced, and to have constantly progressed, after the fall; before, she never had had any pains in the back or pelvis. It seemed as if the fall had been the origin of the affection, and yet, a fall on the sacrum, followed by osteitis and consequent suppuration, would not have given rise to a collection of pus in front; it would have been behind the sacrum. M. Nélaton said, that he was inclined to believe that the fall had caused a violent concussion of the parts contained in the pelvis, with bloody effusion, and this had progressed as it usually does, when the parts are not kept at rest, when inflammation lays hold of it. Perhaps, moreover, the pelvic congestion that accompanies pregnancy had something to do with what had occurred.

It should be said, also, that by the finger in the rectum, a rounded, hard body could be felt, placed transversely from one ischiatic notch to the other; it felt like the extremity of a distended sac of liquid.

This tumor, as must be understood, was, therefore, of great extent; it was a vast collection of pus, the absorption of which was not to be expected; to get rid of it, an opening would have to be made, and this was not without danger. If the sac were opened, perhaps one and a half litres (3.16 pints) of pus would come out, the sac would be emptied, but in the course of a few days it would fill up again; and this would happen again and again, until symptoms of putrid infection would take place, and then death would be the result. M. Nélaton said he could not tell how often he had seen patients in flourishing health, not suffering at all, die in a few weeks after the opening of a large collection of pus. Since the introduction of the use of injections of iodine, the surgeon, however, can do better; and by employing them there is great probability of avoiding the danger resulting from putrid infection. One difficulty, here, when the purulent cavity had several divisions, and when it was so situated with respect to the bones, that pressure could not be made on every part of it, would be to make the iodine come out again, and symptoms of iodic intoxication might take place. M. Nélaton thought it his duty to do something, and injections of iodine afforded the best hope of cure.

In order more fully to satisfy himself as to the origin of this purulent collection, the operation was deferred for several weeks; and, in the mean time, M. Nélaton came to the conclusion that it came from the vertebral column, and descending with the vessels, had followed the branching off of the internal and external iliacs. There was one abscess in these parts, an iliac, a crural, and a gluteal.

The gluteal portion was chosen for making the opening; the iliac, of course, was out of the question, and in the crural, on account of the bloodvessels, it would have to be made on the external side, where the trocar would have to traverse a muscle, and, moreover, might divide one of the muscular nervous branches, which would be very unfortunate. The opening was made in the ischiatic notch, as low down as possible, and the trocar was entered very slowly, so that if it touched the nerve, warned by the pain, its course could be changed.

One litre and eighty centilitres, or three pints and four-fifths, of pus were withdrawn through the canula of the trocar. The injection of iodine, made afterward, came out without difficulty; so easily, that a second injection was made at once, which came out nearly pure, and not mixed with pus as the other, showing that it had acted more thoroughly on the walls of the cavity. The next day, the patient felt some pain in the parts, and there was more heat of skin than usual, but there was no coryza, no pain in the frontal sinuses, no constriction in the throat, no symptom, in short, of iodic intoxication.

The ultimate result of this case, unfortunately, I am not able to give. The last time I saw the patient, the effusion of liquid, which, as usual, had followed the injection of iodine, was nearly absorbed, and her general health was excellent.

The following case, which contains some points of interest, is placed here, as, although not one of Pott's disease of the vertebral column, it bears some relation to the preceding cases.

April, 1853. A man, fifty-eight years of age, and of deteriorated constitution. For eighteen years he had been affected with hemorrhoids, and toward the close of the preceding year he had had a prolapsus of the rectum. Seeking advice from M. Boyer, the actual cautery was used, and under its influence he was cured of these complaints.

For the last two or three months, however, he had been tormented by a flow of pus from the rectum. Examined, the result of the operation, performed there, was seen to be perfect, the parts had entirely healed, and yet there was a discharge of pus. The walls of the rectum, near to the anus, were quite healthy; two inches from it a kind of stricture could be plainly felt, and above that the rectum had its normal characters.

As the discharge of pus was considerable, and as the walls of the rectum were healthy, there was necessarily an opening somewhere, and, seeking for one, at the stricture a small hard spot was found, and in the centre of it was a hole, whence the pus was poured.

It remained to decide whence this pus came; from the prostate, from the vertebræ, or from the pelvis. The man had never had any pain in passing his water, and the catheter passed through the urethra with perfect facility. There had, at no time, been pains in the spine, in the sacrum, or in the pelvis, and, therefore, the idea of an osseous origin to the purulent discharge, was to be excluded. The man said that he had suffered much more in the left side of the interior of the pelvis, than in the right, and that, for some time, there had been a tumor there; at that time, also, he suffered more there.

M. Nélaton said that it appeared to him to be very probable, that an abscess had formed in the right iliac fossa, which had descended, and made an opening for itself through the walls of the rectum.

It should be said, that an attempt was made to pass a sound through the small orifice in the rectum, but it could not be pushed very far.

M. Nélaton gave a very unfavorable prognosis in this case. In order to produce an adhesion of the walls of the purulent cavity, an injection of iodine would be thrown into it, through a catheter passed into the orifice in the rectum. At the same time, good diet and tonics would be given. The patient, however, left the hospital before anything had been done for him.

May, 1852. A boy, fifteen years of age, came into the hospital. M. Nélaton had seen him several years before; he then had Pott's disease of the vertebral column, for which issues had been formed at the side of the vertebræ, which appeared to be affected, and, internally, iodine and iron were administered. At the time he came to the wards, toward the upper part of the lumbar region there was a gibbosity, constituted by the projection of two spinous processes.

This patient was asked to pick up a book placed on the floor, in front of him, and in doing so he *curved his spine;* he did not stoop *vertically*, by bending his thighs and legs, as those persons do whose vertebral column is weak. Another test, still more decisive, was this, that when he raised himself up on the toes, and brought himself quickly down on his heels, he felt no pain. The disease in the bodies of the vertebræ, M. Nélaton, therefore, thought to be cured.

In the iliac fossa of the left side, was a soft fluctuating mass, and there was a part of it that had already escaped under the ligament of Poupart. It was an abscess by congestion, the consequence of the old disease of the spine.

Auscultation showed nothing remarkable in the lungs of the patient. His general condition was very good; he was rather fat and strong.

In these cases of tuberculous disease of the spine, the tuberculous matter, and the suppuration, in order to reach the exterior, having to traverse a considerable distance, gradually accumulate, and are received in a cellulo-fibrous sac, whose mouth is exactly adapted to the circumference of the perforation in the bone. These sacs, thus suspended to the bone by their pedicle, resemble large leeches gorged with blood, attached by their mouths. After the expiration of a certain time, the abscess reaches the iliac fossa, and once there, it is developed very rapidly, for it meets with less resistance; afterward, a crural purulent cavity is formed. The course of the purulent collection is, generally, along the psoas muscle; sometimes it is more external, along the sartorius; or it comes out posteriorly, in the buttock. In some cases, nothing but a fibrous cord is found between the vertebral column and the iliac fossa; the vertebral affection being cured, the canal becomes more and more narrow, until it is obliterated. In this case, M. Nélaton believed this to have happened.

This patient had only been brought to the hospital, that his case might be exhibited to the students, and nothing was said or done, by M. Nélaton, in regard to his treatment.

April, 1854. A young man, from the country, small, but with a well-developed muscular system, came to the wards, to be treated for a tumor situated near the vertebral column. His story was that he had fallen on his back six months before, and this tumor had made its appearance afterward. By answers he made to questions, it was ascertained, however, that, long before that time, he had suffered from pains and weakness of the back.

The tumor in the back was a projection formed by three spinous processes, those of the ninth, the tenth, and the eleventh dorsal vertebræ. Above this tumor, the spinal column was concave, while normally it is convex; and besides, there was a side angle at the seat of the tumor, salient on the right side.

There had been, here, Pott's disease of the vertebral column, that form of it in which a tuberculous mass is formed, by which the body of the vertebra becomes thinner and thinner until it gives way. Long ago it was remarked that in cases of caries of the spine, some patients remained straight, while others became bent: in the first, the caries was said to be superficial; in the second, to be deep seated. All this is very simple, but, and this has been noticed by Boyer himself, the form called superficial is more dangerous than the deep seated, a kind of surgical paradox.

This affection of the spinal column presents itself under two forms; first, tuberculous infiltration; second, encysted tubercles. In the first, the small cavities of the spongy portion of the bone are filled with a substance analogous to tubercle, the infiltrated portion of bone has lost its vascularity, and, if a sufficient time has elapsed when the autopsy is made, this portion of bone will be found to be much harder, much more compact than before; entirely deprived of bloodvessels, it dies, and the work of elimination commences. This form is incurable, for a sequestrum is left; inevitable death is the result. Now it must be remarked that this form of Pott's disease does not bring about a gibbosity, or if it does, it is after a long time, and through a very complex mechanism. The intervertebral cartilages are supplied by bloodvessels from the bones in contact with them, and when these die, they are no longer nourished. If one vertebra is affected, one-half of the cartilage dies; if both, the whole. This, then, is a first cause of deformity of the spinal column, for the two vertebræ will come together. In addition, suppose now the patient walks, the dead bones in contact will be worn away. Pathological anatomy has shown all this. Examine, in such a case, an abscess by congestion, and the bony powder will be found in it; all this might be called, in pathology, demonstration. This is the form called, by Boyer, superficial caries; and why it is more dangerous than the other, can readily be understood.

In the other form, there are tuberculous masses that enlarge, and as they do so, the osseous tissue disappears; in place of the production of a sequestrum, there is absorption; when the yellow matter is removed, a perfect cavity, lined by a living membrane is found. Until the bone yields, there is no deformity, and a gibbosity may form almost instantaneously; at other times, there is a gradual falling together of the sides of the body of the vertebræ, occupying one or two months. In this form, cure could result; and it is not a rare termination of Pott's disease, when there is gibbosity.

In this case, M. Nélaton was sure that the second form of Pott's disease had existed. It is a curious fact, that these tuberculous caverns can pass perfectly well from one vertebra to another; and here, very probably, two vertebræ had given way, though, of course, it was not possible to be certain of this. If no new tuberculization had taken place, the man was cured.

As to the treatment of the case, as far as the deformity is concerned, that is inevitable; it is evident, from what has been said above, that the walls of the cavity must come in contact with each other, before it can get well. The surgeon must never seek to re-dress the column; he may try to prevent a greater curve, by the use of a *preventive* corset, but never must he use a *re-dressing*. The patient can be assured that the form of the column will be so modified, as to make another curve, the inverse of the one first made; a curve of compensation will be formed. This patient did not remain more than a few days.

Necrosis of the Radius.

November, 1852. A young man, by trade a cabinet-maker, twenty years of age, and with the appearance of strength.

Five years before—and previous to that time he had never been sick, never had had anything the matter with him—after having worked all day, he was suddenly attacked with a sharp pain, so great as to prevent him from sleeping, in the anterior part of the forearm. The next day a physician, who was sent for, applied leeches to the part, for there was evidently an inflammatory action going on there. This continued, and, after the expiration of four days, a red spot appeared toward the extremity of the radius, which the physician punctured, thinking it to be the mark of an abscess; no pus, however, came. Afterward, on the ninth day, another opening was made, a short distance from the other, nearer to the elbow, and some pus then issued. These openings never closed, and at the expiration of a year, the patient commenced again to work with three fistulæ on his forearm. These fistulous openings had continued, and the patient came to see what could be done for their closure.

By examination, the side of the radius was found to be larger than it should have been; and, toward the external border, there was a bony projection. With a probe, passed into the fistula, a sequestrum was found.

Several things were to be determined here; whether the necrosed bone was movable; whether there was one piece or several pieces; and, moreover, whether it was surrounded by soft parts, or contained in an osseous sheath.

A probe being passed into one fistula, the sequestrum was touched, and it was found to be moved there, when motions were given to the necrosed bone, through either of the other openings. This examination showed it to be movable, and, also, that there was very probably but one sequestrum, which M. Nélaton thought to be as large as the forefinger.

To examine whether the sequestrum was inclosed in new bone, it must be recollected that pus would be formed around it, which must be discharged externally through openings, called cloacæ. A probe should be passed, as far as the sequestrum, through the openings through which the pus issues, and then withdrawn, pressing it firmly against the bone. When it leaves the bone, there will be a spring, from the difference in the resistance of the tissues. Here, N. Nélaton was in doubt; it seemed as if there was a long sheath in some places and not in others, as if only portions of the sequestrum were thus inclosed. It was thought to be applied against what remained of the radius, and to be held there by bony stalactites.

The disease, here, commenced suddenly; there are acute affections of the osseous tissue, and M. Nélaton said that he had frequently seen cases similar to that of this young man. The patient has acute pain in a limb, often accompanied by chill, while, externally, nothing can be seen; most generally, the physician takes it to be rheumatism, and the error may be made, for this pain is relieved by pressure, and that does not lead him to believe in ordinary inflammatory action. After this has lasted a few days, he detects a collection of liquid, and making a puncture, there is a discharge of pus. This is generally seen on the thigh; towards the sixth or eighth day after the commencement of the symptoms, you have the swelling of the thigh, the puncture, and the detection of the denuded bone.

M. Nélaton showed some excellent representations of the pathological appearances in these cases, and it may be remarked that each plate was accompanied by another, which represented the same part on the sound side of the body. *Corresponding parts should always be examined when an examination is made of disease in bones.*

In this young man, M. Nélaton was convinced that things had taken place as has just been said. He was satisfied that if the physician had introduced a probe when he made the opening on the ninth day, that he would have found the bone denuded.

In this case, the long abductor and the short extensor of the thumb were situated alongside of the fistulæ, and in making the incisions to reach the sequestrum care would be taken to pull these muscles aside.

There are two things which, sometimes, render these operations for the removal of sequestra, quite delicate: one is the difficulty of avoiding the injury of important parts; the other is the hemorrhage. The bone is surrounded by a tissue which is quite hard, a kind of fibro-cartilage, and when it is incised, the vessels remain open and do not close. In case the flow of blood is very great, the surgeon should cover the wound with charpie, and wait until it has ceased. Here the sequestrum was situated about four-fifths of an inch from the surface. If it should be found possible to drag the sequestrum in the direction of the axis of the bone, of course, traction would be made in that direction.

In performing this operation, which was very long and tedious, M. Nélaton was forced to cut a notch in the new bone, on the internal or ulnar side, in order to extract the part which was necrosed. The necrosed portion was about as long and as thick as the forefinger, its inferior extremity being situated very near to the articulation at the wrist. The incisions which were made in the soft parts, were made from one fistulous orifice to another.

Some of the difficulties of the operation had been foreseen, while others had not. There was a deformity of the radius, so that there was a very small space between it and the ulna, and this great diminution in the extent of the interosseous space interfered considerably with the extraction of the sequestrum, which was placed on the ulnar side of the radius. By means of Liston's forceps, the dead bone was cut in two in the notch, which, as said above, had to be made in the new bone, and the superior and inferior fragments extracted separately.

A constant stream of cold water was kept running over the wound after the operation. The next day there was no tumefaction of the parts, no pain, nor redness, nor any muscular hernia, which quite often takes place after an incision made into the aponeurosis of the forearm. There was an appearance of brutality, as M. Nélaton remarked, about the operation, but all the force and violence had been exercised upon the dead bone, which then was removed. In a few days, when all dread of inflammation of the cellular tissue of the forearm was past, the irrigation was stopped, the wound was allowed to suppurate, and it then healed up rapidly, and the patient left the wards, cured.

Necrosis of the Tibia.

At the same time that the case, above reported, of necrosis of the radius, was in the wards, there was another, also in a young man about twenty years of age, of necrosis of the tibia.

The first symptoms of the affection had appeared when this patient was but five years old; since when fifty-two pieces of dead bone had been extracted. On the anterior and internal part of the leg, traces of these operations were very manifest.

The right tibia, the one diseased, was larger than the opposite one, and not only larger in volume, but longer. The increase in length, here, was two-fifths of an inch; in some cases, it is six or eight-fifths, or even two inches. To determine this difference in length, the patient was seated on the floor, in a symmetrical position, his legs being vertical; and, in order to render it more evident, a straight piece of wood was placed upon the knees.

This deformity reacts upon the whole skeleton, and this had happened in this case. One-half of the pelvis was higher than the other, the more elevated half corresponding to the longer limb; the vertebral column, from being thus thrown to one side, had become curved, the concavity looking toward the right side, or that of the longer limb.

M. Nélaton stated, upon this occasion, that he had thought of this, as a means of remedying incurvations of the vertebral column; and, making use of this fact, in order to straighten it, he has given the advice of wearing a thicker sole on the side of the concavity. At that time, he was not able to state the result of the method, for it requires much time.

There was, at the same time, in the wards another patient with necrosis—the case reported above—situated then in the radius, where the same disease had caused a shortening of the bone. The growth of bone, in its length, has been well studied, and the increase is known to take place at the line separating the diaphysis from the epiphysis, at the small layer of cartilage which exists there. In this young man, the disease commenced when he was about fifteen—and this cartilaginous layer does not disappear before the age of eighteen or twenty, when the diaphysis becomes united to the epiphysis by bone—the cartilage had probably been destroyed by the disease which, as has been described, was situated near the inferior extremity of the bone. In his case the ulna had continued to grow.

When the tibia is thus affected, sometimes the foot is turned outward.

November, 1853. There were, at the same time, two cases of necrosis of the tibia, in the hospital; both of them in the male wards, and both in patients about twenty-five years of age.

In one, the disease had commenced twelve years before, and was attributed by the patient to a fall, immediately after which the leg became swelled, with all the symptoms of acute inflammation. Several openings took place, from which pieces of bone came out, and then the parts cicatrized, but from the smallest injury they opened again.

This leg was deformed; the anterior edge of the tibia, in place of being angular, was rounded, and the bone was more voluminous than on the other side. This tumefaction occupied about three-fourths of the bone, and the part affected was about equally distant from its extremities. Over it there was an ulcer, which was easily produced, and with difficulty cicatrized.

The point, however, to which M. Nélaton desired to call attention, was the fact that the bone, more voluminous in its transverse diameters, was also longer than the tibia of the other side. The difference in the lengths of the two bones was one inch. This was easily understood, for this is the usual effect of inflammation in a bone in a young patient, from the influence it has on the layer of cartilage, by the ossification of which the increase in its length takes place; but it was difficult to understand how the fibula, as it had in this case, had participated in the elongation, and how its nutrition had been increased.

The pelvis was raised up on the affected side, so as to be oblique, and the vertebral column had undergone the same inclination, and then, in virtue of its flexibility, was inclined toward the contrary side, so as to have formed a concavity looking towards the side of the longer leg. This could be applied to the cure of certain incurvations of the spine, making the leg longer, and in such a way as to cause the column to straighten; M. Nélaton said that he had tried this, and successfully.

In the second case, the affection of the tibia was not so extensive; it was limited to the inferior part of the bone, just above the ankle-joint. The bone was only diseased in a point, and it was scarcely at all lengthened, but the elongation was at the inferior extremity, and it had resulted from this, that the elongation had made itself felt in the joint. The inferior extremity of the tibia being lowered, the relations of the malleoli were changed, and the articular surface offered to the astragalus was turned outward. In this instance, the deviation of the foot outward was strongly marked.

Necrosis of the Femur.

May, 1852. A boy, seventeen years of age. Three years before, above the knee, toward the lower part of the right thigh, several abscesses commenced to form themselves; these opened, and had never closed.

When he came to the hospital, the right limb was notably atrophied. The knee could not be entirely extended. The limb was deformed as follows: the leg was somewhat flexed on the thigh, and directed outward; and, moreover, there was a movement of rotation, by which the toes were much turned out. When palpation was used, a very hard tumor was found, evidently osseous, that commenced five or six inches above the knee, and, extending downward, was confounded with the extremity of the femur. Fistulous orifices were to be seen, and denuded bone could be felt in them; evidently there was a sequestrum.

The articulation at the knee was not affected, for the superior extremity of the tibia had its normal volume; also, the articulating extremity of the femur, and the patella, could be moved from side to side, without giving any signs of an affection of the joint. Moreover, there was not that pain at the *siège d'élection*, at the internal condyle of the tibia—there was no effusion in the articulation, nor was there any alteration of the synovial membrane. The seat of the disease, then, was in the femur.

M. Nélaton supposed that, in this patient, who, it must be recollected, was very young, an osteitis had taken place in the inferior extremity of the diaphysis, and that the disease had been limited inferiorly, by the cartilaginous partition which separates the epiphysis from the diaphysis.[1]

When the femurs were measured, a difference of seven and a half centimetres, or of exactly three inches, was found to exist between the two sides, in favor of the sound one. How could this be accounted for? for when a bone is attacked with necrosis, as a general rule, it is augmented in length. M. Nélaton said he had recently seen a young man who had the appearance of a grasshopper, on account of the inordinate length of his tibias; here, however, just the contrary had taken place. This is to be explained by the known rules, in accordance with which a bone increases in length; experiments show, that it is by a deposition of bony layers at the cartilage placed between the diaphysis and the epiphysis; here, the extremity of the diaphysis being attacked with necrosis, of course, this deposition of bone had been arrested.

This difference in length also extended to the legs, where, on the right side, there had been arrest of development from inaction. The right tibia was exactly one inch shorter than the left, and this difference was to be attributed, entirely, to the loss from inaction; so that the loss, caused by the necrosis in the femur, might be computed at about two inches, subtracting one inch there, also, as the loss from want of use.

This sequestrum in the femur was very near the articulation at the knee; but M. Nélaton thought it could be extracted, and the articulation still be respected. One of the fistulous orifices on the anterior part of the thigh, which had remained, as said before, ever since the formation of the abscesses, three years previous, was occupied by a small point of dead bone. This fistula, it should be said, was placed four-fifths of an inch above the patella; there were two others, more distant from the articulation, one of them more than three inches. When a probe was passed into the fistula, and placed carefully in contact with the small bony point, and then another probe introduced into another fistula, and placed upon the sequestrum there, communication of movement was had between the two. There was but one sequestrum, rather more than three inches long, situated in the femur, above the epiphysis.

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[1] It is not until after the twentieth year, that the inferior extremity of the femur, although it makes its appearance before the other, is united to the body of the bone. This osseous point makes its appearance in the last fifteen days of fœtal life, and its constant presence is of great importance in medical jurisprudence; for by it alone, one can affirm, according to Cruveilhier, that the child is at term.

When a sequestrum is situated in a diaphysis, it tends to come out, by virtue of a movement of incurvation which the body of the bone undergoes. This curve, which takes place in the bone, is to be explained in the same way as the increase in length which a bone containing a sequestrum undergoes. Suppose a sequestrum to be placed in a diaphysis, nearer to one side; that side, more irritated than the other, becomes more augmented in length by the hypertrophy of its tissue; and it results from this, the sequestrum being inflexible, that the incurvation of the bone must exercise a pressure upon its extremity, causing an absorption of bony tissue by which the sequestrum is disengaged.

An operation, for the extraction of this necrosed piece of bone, would be very easy, for the young man was thin, and, moreover, the sequestrum had forced its way through the muscles, as it had before through the bony parts.

M. Nélaton made a longitudinal incision on the anterior part of the thigh, connecting the two most widely separated fistulous orifices, and dividing the tendon of the rectus muscle in an extent of more than two inches. In enlarging the perforation in the bone, for the purpose of extracting the sequestrum, the instrument of M. Luór was of great service. The necrosed bone removed, a cavity lined by a pyogenic membrane remained in the bone; always, when there is a cavity in a bone, the walls are found to close together; after the extirpation of the globe of the eye, the orbitar cavity becomes smaller.

Water dressings, as usual, were applied to the parts, immediately after the operation. No swelling or redness of the parts followed, nor did any symptoms of fever show themselves; on the third day of the operation, the patient was put upon full diet. The parts healed, with the exception of one fistulous orifice, in which, about three weeks after the extraction of the large sequestrum, a small piece of dead bone was detected by the probe. A piece of gentian root was introduced, in order to dilate the fistula, and then a piece of prepared sponge, so that in a few days the finger could be passed in; and then it was found that the forceps could be introduced, and the sequestrum brought out. After that, the cicatrization of the parts was most rapid, and the patient was soon able to leave the wards.

The passage of a sequestrum into an articulation is extremely rare, but it is sometimes seen. There is one example in the museum of Dupuytren. In that case, the femur had not been bent; it had remained straight, and the sequestrum had pierced the bone, and penetrated into the joint behind, between the two condyles.

Necrosis of the Metacarpal Bones.

Together with the case above reported, there was another case of necrosis in the wards; the disease was situated here in one of the metacarpal bones; but, so far as the dangers of the operation for its extraction were concerned, M. Nélaton considered it as much more serious than when it was in the femur.

This patient was a man, fifty years of age, by trade a stonecutter. Fifteen months before, while at work, he felt a sharp pain at the internal or ulnar edge of his hand, or in the region of the fifth metacarpal bone, whenever he made a blow with his hammer. The same day, a small steel-pointed instrument was forced into his hand, between the fourth and fifth metacarpal bones, and it caused a great deal of hemorrhage—so much that he was unable to continue his work. Ever afterward, that part of the hand had been more or less painful, when, six weeks previous to coming into the wards, a swelling commenced there.

At the time he entered, the ulnar side of the hand was swollen and painful; it evidently contained pus, and a puncture was made on the palmar surface, in order to let it out. After the discharge of the pus, a probe was introduced, and the presence of a necrosed piece of bone detected. At first, this was supposed to be near the extremity of the fourth metacarpal bone; but a more careful examination showed it to be the fifth; there was a very great tumefaction of the ulnar side of the hand, and the fifth metacarpal bone was nearer the middle of the hand than usual. It was only in the fifth metacarpal bone that motion was painful. The bone was affected in the part where it touches the fourth metacarpal.

This affection, M. Nélaton said, was an old one, that had recently commenced to be complicated with inflammation in the adjacent soft parts; and these abscesses that had commenced to form in the palm of the hand would continue until the necrosed bone by which they were caused was removed. In order to remove this, it would be necessary to take away the whole of the fifth metacarpal bone; and as, if the little finger were left it would tend to turn outward, it would have to be removed also.

This operation would not be free from danger, for there is but one synovial membrane at the wrist for the fourth and fifth metacarpal bones, and in the amputation of the latter, by the opening of this membrane, there would be danger of inflammation of the carpal articulations.

In performing the operation, chloroform was administered to the patient, and the oval method was preferred, as having the advantage of leaving but a linear cicatrix. The usual water-dressing was afterwards made use of.

The next day the patient complained of acute pain, extending through all the articulations of the wrist. Leeches, &c., were applied, but the inflammation continued, pus formed in the articulations, and the patient died in a few days of purulent infection.

May, 1853. A boy, twelve years of age, and stoutly made. He had been in the wards seven or eight months before, previous to which he had been in those of M. Jobert, at Hôtel-Dieu, in order to be treated for a white swelling at the wrist-joint. M. Jobert had treated him, as he generally does cases of white swelling, by placing the limb in a pasteboard splint, and covering the parts with an ointment of nitrate of silver; under this treatment, however, the affection got worse. There were, at that time, two abscesses on the palmar face of the wrist, in the neighborhood of the tendon of the flexor carpi ulnaris, which were opened, and on account of the engorgement of the soft parts, long and deep cauterizations were made in front of the articulation with the actual cautery. Soon afterward, on account of alterations, which were being made in the wards, he left, and entered those of M. Lenoir, at Hospital Necker. Nothing of any importance had been done there.

Under the influence of these cauterizations, in place of that soft, fungous engorgement, which had existed before about the wrist-joint, there was nothing there but a thin pellicle of integument. One point, diseased, still remained. On the dorsal surface of the hand, at the union of the carpus with the metacarpus, was a projection, in which was a fistulous opening; when a probe was introduced into this, a piece of bone, evidently necrosed, was encountered. This piece of bone was at the third metacarpal bone, at its posterior part; its extent appeared to be three-fifths of an inch. It was important to know if the articular surface of the bone was comprehended in the sequestrum, and the probabilities were that it was not. The articulations of the wrist were then absolutely healthy, and a sequestrum in contact with them would have been a great obstacle to their return to a normal condition; it was *almost* certain that it did not extend so far. This sequestrum, also, seemed to be movable.

As this patient might be called cured, and as all that prevented his complete cure was the existence of this sequestrum, was anything to be done for its removal? Was it best to wait for it to come out, or was an operation to be performed for its extraction? If the patient were rich, he might wait, perhaps; but this boy was poor, and while waiting, he would be forced to remain in a hospital, for he would be compelled to work at once on going out. Moreover, it was not altogether prudent to allow a sequestrum to remain in the vicinity of a joint that had just been diseased. M. Nélaton said he would make an incision, taking care not to cut any of the tendons, and introduce his finger, so as to make the diagnosis more precise, and remove the sequestrum, if entirely movable.

It may be noticed that this boy could not flex the first phalanges on the metacarpal bones, but could flex the others. It was not because the extensor tendons were not free, nor the flexor: and the articulation was perfectly healthy. The difficulty was attributed by M. Nélaton to this: that the abscess enveloping the interosseous muscles, had converted them into a cicatricial tissue, and that they were always contracted.

On account of a sore hand, from a dissecting wound, M. Nélaton deferred the operation for ten days, and when ready to undertake it, he had arrived at the conclusion that it would be necessary to remove the whole superior portion of the third metacarpal bone. This bone has been resected by M. Textor, of Strasbourg, and, it appears, a part of the os magnum with it.

The important point to be noticed in the anatomy of the parts, before proceeding to the operation, is the projection of the articulating portion of the third metacarpal bone, between the os magnum and the trapezoides. It is also very difficult to cut the ligaments, so as to disarticulate the bone. The deep-seated palmar arch must not be forgotten.

An incision would be made, on the dorsal face of the hand, parallel to the axis of the bone, and, in order to facilitate the opening of the flaps, two lateral incisions would be added. After the bone had been isolated from the muscles, it would be cut, beyond the diseased portion, with Liston's forceps, and then the fragment being seized by the davier, or strong dentist's forceps, the ligaments would be divided, and the disarticulation completed.

In place of performing this operation, some surgeons extirpate the whole metacarpal bone; and others, saying that the finger will be useless, cut it off also. When the metacarpal bone is removed, the finger goes up into the hand; and, in order to prevent this, Liston advised circular compression of the hand.

The dangers of this operation were quite serious, and they resulted from the possibility of inflammation of the neighboring articulations; it would be impossible to avoid opening a series of them. These dangers are real, but they should not be exaggerated; every day these joints are opened without bad results, and but recently[1] the cuboid bone, in the tarsus, had been removed by M. Nélaton without the occurrence of any consecutive inflammation.

After the deep incision had been made on the back of the hand, by the introduction of the finger, the necrosed piece of bone was found to be small, and inclosed in a cavity. It was extracted by means of forceps. Cold water was kept running over the parts for a few days, and there being no symptom of inflammation, it was then withdrawn. The patient soon went out cured.

Necrosis of the Cuboid Bone.

The case above referred to, of successful amputation of the cuboid bone, was in the hospital in January, 1853. The patient was a young boy, sixteen years of age, who said that one year before, when he was perfectly well, a swelling formed on the dorsal surface of the foot; this swelling, be it understood, was the first symptom; soon afterward it became painful, and then abscesses formed, that had opened themselves, and since then had never closed.

On the left foot there was a swelling, about one and a half inches in diameter, placed about one inch from the articular surface of the tibia and the external malleolus, and two-fifths of an inch from the plantar surface of the foot. The centre of this tumefaction was the cuboid bone. The integuments were smooth and red; there were four fistulous orifices and, in addition, there was a small abscess, not yet open. By introducing a probe into these fistulous openings, naked bone was encountered. It was impossible to ascertain with certainty if the whole cuboid bone was affected, or if but a portion was necrosed; the necrosed bone was not movable.

The affection here existing was a serious one, with a tendency to propagate itself; every day, articular surfaces in the neighborhood of necrosed bone, are seen to become inflamed. The removal of the cuboid bone would be attended with some danger, but it would be better to operate; it being well understood that, if a slight adherent sequestrum should be met with, the operation would be modified.

This operation, the amputation of the cuboid bone, has been very seldom performed. M. Nélaton was acquainted with but two instances. M. Moreau, of Blois (?) was the first, but he comprised, in his operation, parts in the neighborhood, the heads of the metatarsal bones; in 1842, it was performed by Velpeau.

If ever a favorable case for the operation had presented itself, it was this one; every movement of which the articulations of the foot are susceptible could be made without any difficulty and without pain to the patient. But it was necessary not to dissimulate; all the extractions of bones of the foot are more or less dangerous. Here, the only dangerous circumstance attending the operation would be the opening of the articulation of the scaphoid with the three cuneiform bones. M. Nélaton showed, upon a fresh preparation, that the cuboid bone could not be removed without opening this articulation, and also explained the difficulties of the operation, from the powerful ligaments uniting it to the other bones, particularly to the calcaneum. It was a doubtful point whether the tendon of the peroneus longus should be preserved; the cuboid bone is the pulley by means of which it acts, and this was about to be removed; besides, it was very probable that there would be such inflammatory action following the operation, as to fasten the tendon too firmly to be of service in moving the foot. If easy to leave it, therefore, it would not be removed; but, should any difficulty be experienced, it would be excised. As to the effect of the removal of the bone, upon the foot, it was probable that the parts would be filled by a cicatricial tissue, which would give to it the desired firmness.

In performing the operation, M. Nélaton used a scalpel in order to divide the dorsal ligaments; for the plantar, he used a pair of curved scissors; for greater security, in cutting beneath the bone, a probe-pointed bistoury was employed. As to the tendon of the long peroneus, it was rather of service than an annoyance, in the extraction of the bone, the whole of which was removed.

The usual cold-water dressing was applied immediately after the operation. None of the articulations afterward became inflamed. The parts healed up rapidly, the hole was filled by cicatricial tissue, and the boy left the hospital perfectly well, and without the slightest deformity of the foot.

This patient returned to the wards in the month of July, six months after the operation, in order that his condition might be examined. The foot was not at all deformed, neither turned to one side nor the other; by the touch, of course, a modification of its skeleton could be detected, the projection of the cuboid bone being absent. It might be feared that the tendons of the lateral peroneal muscles, having no *points d'appui*, could no longer maintain the foot in a straight position, and that it would be turned inward, but nothing of the kind had occurred.

A German student told M. Nélaton of another case, in which this operation had been performed, thus making his own the fourth with which he was then acquainted.

Necrosis of the Calcaneum.

February, 1854. A young boy, about sixteen years of age, who, six months before, experiencing a difficulty in walking, saw that the external part of the heel was swollen. He kept quiet, and leeches were applied to the spot, but the swelling increased; there was fluctuation, and an opening being made, pus was discharged. After waiting some time, the orifice not closing and still discharging pus, M. Nélaton was sent for, and on examination, by the introduction of a probe, a portion of the calcaneum was found to be denuded.

It must be remembered that a portion of bone can be denuded, and for all that, not be necrosed; in the course of the preceding twelve months, M. Nélaton had seen two cases similar to this one, in young children, in which the parts healed without any elimination of bone; and, therefore, he had advised this boy to wait. Four months had then elapsed, and now there was a sequestrum; for which he had brought the boy to the hospital in order to operate upon him.

On the external face of the heel, about one inch below and somewhat posterior to the external malleolus, there was a fistulous orifice, in which, when a probe was passed three-fifths of an inch, a sequestrum was encountered. The necrosed bone was a portion of the calcaneum, and, as it was easy to see, was necessarily in the upper part. It was most favorably situated for extraction, for the only parts of any importance in the way, were the tendons of the peroneal muscles, the opening of whose serous sheaths would be regretted. This facility with which the operation could be performed, decided M. Nélaton to act.

Was this osseous alteration a necrosis? The piece of bone affected was very hard—some surgeons would call the disease *hard caries;* the name applied makes no difference, yet it is important to know the fact, that sometimes pieces of bone are denuded and hard, and yet remain, causing suppuration, without having any tendency to be eliminated. Here, M. Nélaton said, he would not be surprised to find a sequestrum loose, and invaginated in the calcaneum; its condition, however, would be known as soon as an opening should be made down to it. As to the affection, in which the bone remains hard, causing suppuration, and yet having no tendency to become loose, M. Nélaton said he had again and again tried the actual cautery, and other applications, but with no good effect; the only thing to do is to excise it.

At the operation, a crucial incision was made, in order to expose the bone. They caused a surprising flow of blood, as is generally the case in such circumstances, but it soon ceased. A small piece of dead bone was found loose, invaginated in the calcaneum, and was removed.

The wound was kept constantly irrigated for the first few days, by means of the apparatus usually employed; that is to say, a bucketful of water was suspended over the patient, from which led a flexible tube, at the extremity of which was a piece of linen placed there, over the wound, in order to diffuse the water.

This patient left cured.

Exostosis of the Tibia.

February, 1853. A boy, nineteen years of age, employed as a cook, with an affection of both the tibias, which had commenced eighteen months before. The internal face of the middle of the right tibia increased in volume; without any preceding pains, that portion of the bone became larger and larger, and then the tibia of the other leg, at exactly the same place, became affected in the same way. After some time, the patient said, the affection of the left tibia disappeared, but it was not so, for some augmentation in volume still remained. In the right tibia it had always continued to increase; the tumefaction there was at least four inches long, fusiform; its projection was considerable, being at least one and a quarter inches. There was not only augmentation in that one spot, but the whole circumference of the bone was increased.

The cause which had determined this patient to enter the hospital was an acute pain he felt in this tumefaction, above all at night. Pressure also gave rise to sharp pain, but the nocturnal pains were those of which he chiefly complained. There was no suffering in the left leg, neither at night, nor on pressure; it was easily seen not to be healthy, however, for there were nodosities upon it.

Was this affection an osteitis, pure and simple, or was it one depending upon a general cause, tuberculous or syphilitic; or was this projection in the bone owing to a tumor developed internally, and pushing forward?

It was not the last, for in such cases there is an osseous cyst covering the tumor, and they have a different shape; they appear to be applied to the bone, and not, as here, to be a swelling of the whole portion of the osseous tissue. Again, the cystic tumors of bones are not painful, and, moreover, their progress is quite rapid.

The disease was then an osteitis, an inflammation of the osseous tissue, and it had caused an augmentation of the part, by causing a deposition of new layers of bone. These tumors are formed in two ways: first, by a kind of osseous expansion of the primitive tissue, by what might be called osseous tumefaction; and secondly, by the deposit of new osseous substance on the surface of the affected bone. The first form is exceedingly rare. M. Nélaton said that, when engaged in studying diseases of the bone, he was ten or twelve years before finding one. These pretended tumefactions of bone, are almost always only deposits of bony tissue, of new formation, on the surface of the old bone; when the bone is cut in half, they will be seen to be formed, not by fibres describing the curve which the contour of the tumor follows, as is the case in osseous expansion of the primitive tissue, but by fibres, pressed closely against each other, and perpendicular to the old bone. Such a deposit may be found in the interior, and then the medullary canal may be obliterated.

The consideration of the anatomical question in regard to the formation of the exostosis, however, was not sufficient; it was necessary, if possible, to know its cause. It was not owing to a tuberculous deposition, for the disease had commenced a year and a half before, and there was no effort to penetrate the bone. Syphilitic affections attack symmetrical points of the body, above all, syphilitic exostoses; but it was difficult to suppose this to be syphilitic, for the patient was young, and it had commenced eighteen months before; and, when asked, the boy could not remember to have ever had any connection with a woman anteriorly to its appearance. He said that he never at any time had had either chancre or gonorrhœa, but he admitted having been where they are caught. If true that he never had had any syphilitic affection, might not this disease of the tibias be a manifestation of hereditary syphilis? Although men of great distinction, who make a speciality of this affection, say no, M. Nélaton said that he himself admitted these hereditary symptoms of syphilis, and that he was very much disposed to think this to be one. The patient was asked as to brothers and sisters; there were five other children, and none of them had any similar disease. Yet this boy was the youngest, and syphilis might have been caught after the procreation of the fifth. His father had sores on the legs, not one large sore, but many small ones; syphilitic sores are generally multiple, and very probably those of the boy's father were syphilitic.

This patient was treated for tertiary syphilis, by iodide of potassium; at the expiration of ten days, the nocturnal pains went away, and soon afterward there were none upon pressure. As to the exostosis, M. Nélaton said, they can never be made to disappear, whatever be the treatment; the pains can be driven away, and their further growth prevented, but they never disappear; that is an illusion.

CHAPTER X.

CARTILAGINOUS TUMOR OF BONE—CANCER OF BONE.

Enchondroma on the Finger.

NOVEMBER, 1851. A young man, twenty years of age, with a tumor, having for its seat the first phalanx of the ring-finger. Some years before, he had hurt his finger, and ever since he had felt that something was wrong there. The tumor had gradually grown, without causing pain, until his entrance to the hospital.

This tumor was situated upon the radial part of the phalanx, all the palmar part being likewise covered by it; it extended downward as far as the second phalanx, and upward half an inch beyond the fold at the palm of the hand. It was never painful, except when roughly handled. When pressed, there was a crepitation, giving the idea of the rupture of small pieces of bone. A new observation, made by the patient himself, was that the tumor was perfectly transparent. It was a cartilaginous tumor, an enchondroma, solid, compact, and constituted by a cartilaginous tissue, a little more transparent, however, than the normal cartilage. It resembled the opal stone, slightly bluish, and transparent.

These tumors are formed by cartilaginous masses in the bony tissues. There are two varieties: in one, the cartilaginous tissue forms the peripheric portion of the tumor, which is osseous in its centre; in the other, the cartilaginous tissue is in irregular masses in the interior of infractuous cavities with which the bony tissue is hollowed. In this form the bony tissue, contrary to what is seen in the other, forms besides, on the periphery of the tumor, a continuous envelop, constituted by the assemblage of a number of small, white, and hard, rounded masses, which give to the whole exostosis the appearance of a cauliflower. This tumor was thought to be of the second variety. The whole hand of a child is well known to be transparent, and thus this tumor could be so, although it contained portions composed of osseous tissue.

These tumors can remain a long time indolent, but it is not uncommon to see a sudden change in the phenomena; to see them increase rapidly in size, and become very painful. This rapid increase is owing to the effusion in them of a great quantity of liquid. In some cases, the skin opens from the distension, the air comes in contact with the huge mass, and putrid decomposition takes place.

In the treatment of this case, disarticulation of the finger was the only resource, for in endeavoring to resect the tumor, there would be great risk of still leaving some cartilaginous portions in the bone.

In the operation, the oval flap was made, slightly modified, after the method of M. Soupart, the object of which is to cover the part with a single flap. The patient recovered without any accident.

Enchondroma is the name given by Müller to tumors forming smooth, rounded masses composed of cartilage. These cartilaginous tumors are developed, most generally, on the phalanges, and the metacarpal bones of the fingers. Of the thirty-four cases collected by Müller, twenty-three were on the phalanges and the metacarpal bones, three on the leg, one on the thigh, one on the ilium, one on the ribs, one at the base of the cranium, one in the parotid, one in the mammary gland, and two in the testicle. Of six other cases recorded in the works of Lebert, of Glüge, and of Vogel, two were on the phalanges, one on a metacarpal bone, one in the interior of the tibia, one in the subcutaneous cellular tissue on the left side of the neck, and, finally, one between two lobes of the lung.

These tumors are sometimes situated on the surface of the bone, and sometimes in the interior, when they distend the osseous substance, just as those fibrous tumors occasionally met with in the lower jaw.

Many authors, who desire to regard a morbid production in a tissue as a return of that tissue to its fœtal state, have maintained that cartilaginous tumors were owing to a transformation of bone into cartilage. But bone never does this; when once formed, it remains as such; it may be absorbed and replaced by another tissue which is *substituted* for it, but its tissue is always the same; in osteomalachy, for instance, the bone is thinner, but the tissue itself is not softened; the microscope and the analysis of the immediate principles show this to be true.

As a general rule, in enchondromata the four varieties of cartilages are found, that is to say, a solid, homogeneous substance, with cavities, containing a clear liquid, or a mass of granulations or cells; and a fourth variety, or fibro-cartilage, distinguished from the preceding by its fundamental substance, which, in place of being homogeneous, is fibroid, without, however, being divisible into isolated fibres. Sometimes this last variety, the fibro-cartilage, is found alone; as in the masses, really cartilaginous, of certain fibrous tumors, removed from the testicle, the mammary gland and the side of the neck, not touching the bones, and presenting toward their centre these masses of enchondroma.

It may be well to state that many of the morbid productions called cartilages, are, in reality, not so. Among them are many of the false membranes of the pleura and of the peritoneum, and portions of fibrous tumors constituted by fasciculi of fibres united together by amorphous matter of great consistence, matter that often gives to the tissue the appearance of cartilage. This kind of fibrous production is readily incrusted with calcareous salts, above all, with carbonates, as every other slightly vascular tissue, and this has caused the belief that they underwent ossification; but the incrusted portions do not present the characteristic elements of the osseous tissue nor its immediate composition.[1]

The four varieties of cartilage are all found in callus, and as they will necessarily be referred to when describing the union of fractures, this opportunity is taken to speak of them.

The *first variety* consists of cartilages formed of a homogeneous substance, with ovoid cavities from 0.01 millimetre to 0.02 millimetre ($\frac{1}{2500}$ to $\frac{1}{5000}$ inch) broad, containing only liquid, without any granulations or cells. This variety is also called *fœtal*, from being the cartilage of ossification of the bones of the cranium, and from the way in which their ossification takes place, it is also called *cartilage of invasion* (*d'envahissement*). This variety of cartilage is only found there, and in what are called the *couches d'accroissement* of the long bones. The peculiarity of this variety, and the one giving the cartilage the name of *invading*, is the fact that as bone invades it, it invades the other tissues. A layer $\frac{1}{125}$ to $\frac{1}{250}$ inch in thickness, is found, and as it becomes ossified, it extends beyond into the adjacent parts.

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[1] See page 192, Formation of Callus.

The *second variety* is characterized by cavities, long and very narrow, that contain no cells, properly speaking, but masses of granulations, generally of a yellowish color. This variety is found in the fœtus, and in young subjects until one or two years of age, forming the cartilages preceding both the long and the short bones. In the patella, and also in the calcaneum and some bones of the tarsus, where ossification takes place very late, the third variety of cartilage, that in which there are cells, properly so called, is sometimes found. The two varieties of cartilages, the most important to be well acquainted with, so as to understand ossification, are the first and the second.

The *third variety* of cartilage, is the one generally described in books; it is the cartilage, properly speaking, of adults. It is characterized by a homogeneous substance, in which are found cavities, containing from one to thirty cells; the size of the cavity depending on the number of the cells. These cells can be arranged one after the other in a row, or in masses of various shapes; they contain a rounded and granular nucleus, when it has not been absorbed under the influence of the drops of oil that are often deposited in the cells in large quantity, from age, or some pathological change. These drops of oil give a very strange appearance; but the fundamental structure is very soon seen to be the same. If some cartilage be taken from the nose, it will have a different appearance from that from the ribs, but it is only owing to a difference in the distance of the cavities or chondro-plastes from each other; in the cartilages of the nose, the larynx, and the bronchial tubes, the cavities are very near to each other, while in the ribs they are more distant. In the articulations, no drops of oil are found in the cells, and but one or two are contained in a cavity; but the structure is still the same. The central portion of the intervertebral disks is composed of true cartilage, but its fundamental substance is very soft, and the cavities are very large, very round, and contain a great many cells.

The distance of the cavities from each other, the number of the cells contained in them, and the drops of oil, change the appearance of this variety of cartilage, but the fundamental structure is always the same.

The *fourth variety* is distinguished from the others by the fact that the fundamental substance, in place of being homogeneous, is fibroid. The third variety may change into the fourth, as is seen in the cartilages of the ribs in old persons; it never takes place, however, in the articulations, and very rarely in the larynx. The cavities in this variety, as a general rule, contain very few cells.

Except in the first two varieties of cartilage, or the cartilages of ossification, this tissue, normally, never contains any blood-vessels. When ossification is about to take place, as in the thyroid cartilage or in the ribs, in old persons, canaliculi form, and vessels traverse them; but it is only when ossification is about to take place. It may be noticed that the canaliculi, which are analogous to the Haversian canals in bones, besides the vessels, contain marrow.

The following case, which proved to be one of cancer of the sternum, was admitted as enchondroma.

March, 1853. A man, in the prime of life, and with the appearance of strength; by trade a vine-dresser. For several years he had had pain in the sternum; and after suffering thus for two years, he noticed a swelling there, at about the middle of the bone. As to its appearance, its mobility, or its increasing with cough, etc., the patient could tell nothing.

At the time of his entrance into the hospital, the affection had lasted for five years. There was an enormous hard tumor at the lower part of the sternal region; it extended laterally beyond the cartilages of the ribs, and downward as far as the union of the last bone of the sternum with the xiphoid cartilage. The base of the tumor was lost insensibly in the sternum. The projection of the mass in front of the chest was considerable. There were protuberances here and there, and the skin covering it was visibly changed. This alteration of the skin seemed to consist in a hypertrophy of the small glands secreting the sweat, as was more plainly seen by using the magnifying glass. The skin over the largest protuberances, and only there, was adherent.

This tumor was consolidated with the anterior wall of the chest. It was not fluctuating; there was no pulsation in it. The patient suffered very much, without, however, uttering a complaint; his pains were increased by touching the part. In the last two months, the mass had nearly doubled in size. Percussion everywhere was clear; there was no reason to suppose that any portion of the tumor was in the chest. This was what could be noticed for the *local* diagnosis of the tumor.

The tumor was not syphilitic, for there would have been others; and again, M. Nélaton said he had never seen any like this. It did not have at all the characters of tuberculous tumors; there were no signs of suppuration anywhere about it.

The tumor was either a cancer of the sternum or an enchondroma. M. Nélaton said his hearers would be astonished by this; but when they considered the transformations which enchondroma undergoes, they would not wonder at his speaking of it as resembling cancer. At the commencement, it has the peculiar characters of cartilage, but after a time a vascular network forms in it, which M. Nélaton said he had seen so much developed that pulsations could be felt. He was inclined to think this an enchondroma, chiefly from its duration; it was still hard, and it had commenced five years before. But this diagnosis between cancer and enchondroma, in other situations so very important, here, in this case, was but a superfluity; for it was impossible to excise the tumor. M. Nélaton did not think its removal at all practicable.

This patient died in May, just two months after his entrance into the wards. The projecting portions of the swelling softened, then ulcerations formed, and every day there was an elimination of encephaloid tissue. Afterward there were hemorrhages, and through them and the great pain he suffered, the patient finally became exhausted.

At the autopsy, the pleuræ presented a most curious spectacle, impossible to describe; they were covered with thousands of bosses, composed of cancerous matter. They adhered throughout to the anterior part of the chest. The lungs themselves were full of cancerous deposits. When the pericardium was opened, it was found to have entirely escaped; its internal surface was perfectly smooth.

Cancerous Affections of the Bones.

Of the Femur.

November, 1853. A man, forty years of age, quite emaciated, but not in marasmus; his condition still admitted of a serious operation. He had been sent to the hospital as affected with fungosities of the synovial membrane at the knee.

Of the antecedents of the patient only one need be mentioned, and that with reserve. He said that his father died at the age of fifty-nine, from an ulcer of the leg, after having suffered a great deal from it. Now, it cannot be affirmed that an ulcer which caused great suffering, was an ulcerated cancer, but it is possible that it was so.

In the month of December, 1852, he felt the first symptoms of the affection, what he called *engourdissement*, numbness, in the left knee, and feebleness in the left lower extremity. When examined as to the sensation, he said at first there were pains like flashes of lightning shooting through the part, very rare, but afterward more frequent; the pain, when he came to the wards, was a dull, heavy pain. In the month of February following, he noticed a tumor on the internal lateral portion of the femur, above the condyle, as large as the egg of a chicken, and its great diameter in the axis of the limb; it increased in size, and at last gained the anterior, then the external part of the thigh, and at the same time the popliteal space was invaded. Moreover, this tumor was very hard at first; the patient had sought to move it, but it was very firmly fixed. The man was very intelligent, and had observed very well the progress of his disease.

At the time of his entering, the tumefaction was very considerable, above all at the superior part of the knee, or, more properly speaking, the inferior portion of the femur; this tumefaction was quite regularly uniform. On the exterior, the skin was marbled, in some places from small ecchymoses, in others from bloodvessels which could be seen through the thinned integument; in the upper part, on the thigh, the veins were enlarged, and at parts corresponding to these veins, the tumor felt as if grooved. As to the consistence, at the internal part, where it had commenced, the softness was remarkable; there, there was fluctuation, what is called *false* fluctuation, a bad term, for the fluctuation was as frank here as if there had been a collection of pus. In other parts of the tumor the softness was not so great. By attention, on leaving the hand applied, uniform pulsations could be felt. In the popliteal space, the *internes* thought they could perceive a *bruit-de-souffle;* M. Nélaton himself could not hear it, probably from the noise in the ward when he made his visit.

Without going further, the diagnosis of this disease could be circumscribed to three affections. 1. White swelling, the kind formed by fungosities of the synovial membrane; 2. A vast hydrarthrosis with thickening of the walls; or 3. A cancerous affection. M. Nélaton has seen errors made with all these three affections, and by intelligent men, well up to the times as regards the science of surgery.

Fungosities of the synovial membrane, in some cases, present the same appearance that this one did, giving to the touch a feeling of softness and of fluctuation. Again, another circumstance is this, that some white swellings of this kind present pulsations, and the surgeon must take care not to be deceived by them. There were many other reasons for refusing to admit this disease to be a white swelling, but M. Nélaton, in mentioning them, limited himself to the chief, the origin: the tumor has commenced at some distance from the joint and finished by covering it; again, at the beginning it was hard: there is nothing like that in tumors formed by fungosities; again, in some places it was hard, in others soft; when the synovial is affected, all is equally soft. Without hesitation, then, the supposition of its being this affection would be rejected.

Between the other two affections the diagnosis is more easy, yet as the error has been committed of confounding them, attention should be called to the possibility of it. A man had been in the wards but a short time before, who had entered for cancer, and the affection had been proved to be only a vast hydrarthrosis.

[1] See page 239.

In such cases all the bonds of union at the articulation are loosened, and the limb turns in every direction; again, they are of very long duration, and it is only when very old, that the mistake could be made. In this present instance the tumor had only commenced the preceding February.

This disease was, therefore, a cancer. Where originally developed was a superfluous affair, so far as diagnosis and treatment were concerned, but M. Nélaton thought that very probably it was a cancer developed in the bone.

Some cancers begin in bone, and replace, so to speak, the osseous tissue; you find a loss of compact tissue filled up by cancer. In the neighborhood of this loss of substance, the bone does not appear to have undergone any alteration. This variety, it may be added, is often seen in the condyles.

In a second variety, or a second form of cancerous affection of the bones, the bone is pushed before the cancerous mass as it is developed, in place of being destroyed, as in the first form, just spoken of. It is difficult to account for this, but observation seems to show that in the first form the cancerous tissue is in immediate contact with the osseous, while in this, there is a fibrous envelop around it. The bone, as it gradually yields, becomes thinner and thinner, and forms at last a very thin, very friable shell around the cancerous mass (spina ventosa of the books).

A third form resembles this second very much. When the tumor is cut open, a large number of cells are seen, very irregular in their forms and dimensions, and filled by cancerous tissue; it looks as if there were a considerable rarefaction of the bony tissue, in the cells of which the cancerous matter was deposited (osteosarcoma).

A fourth form is very rare; from a bone a great number of bony needles arise, all, generally, in the same direction for a certain distance, and then a mass of them in another direction; all are plunged in a cancerous mass enveloping the whole. These excessively fine bony prolongations, which might be compared to hairs implanted upon the surface of the bone, are sometimes one or two inches long. Of this variety M. Nélaton showed a specimen in the lower jaw-bone, amputated by M. Maisonneuve.

In this patient, the disease was believed to be this fourth form, developed on the surface of the bone. It very often happens, as was supposed to be true here, that the articulation is not invaded.

It is important, in speaking of the development of these tumors, to remark that they never invade the cartilaginous tissue; when they have had their origin near the articular extremity of a bone, the diarthrodial cartilage is found intact in spite of the complete degeneration of the epiphysis supporting it. When a joint is invaded, it is by the extension of the disease to a point where the bony tissue is only covered by the periosteum and the synovial membrane.

What was to be done in this case? In a few months, if left alone, the patient would die from exhaustion. The inguinal ganglions were intact; if even they had been somewhat larger than usual, that would not have been a reason for supposing them to have been invaded by the disease, for leeches and irritating external applications had been made to the knee, before the patient came to the hospital, under the idea that the affection was one of fungosities of the synovial membrane. It was necessary to operate to remove the disease, and the only operation to be performed for this purpose was the amputation of the limb. In regard to the method of doing this, a very oblique incision would be made, in order to take the whole flap for covering the stump from the anterior part of the thigh. This is done in order to avoid a posterior cul-de-sac, where the liquids afterward effused can sojourn.

The incision which M. Nélaton made around the limb was very oblique, as he had said; the anterior portion of the flap, which was of sufficient size to cover the whole bleeding surface, was fastened to the inferior portion by means of some sutures and adhesive strips.

In order to examine the parts amputated, an antero-posterior section was made, dividing the soft parts and the bone. The tumor was found to have developed itself upon the exterior of the femur; it was the form of cancer of the bone described above, as composed of osseous needles, the whole surrounded by cancerous production. The respect for the diarthrodial cartilages was also noticed; the articulation was free from disease. M. Nélaton added a few words to what he had already said as to the march of these tumors; he has seen a great number of them, and has observed that there is a much smaller chance of a return of the disease than when cancer attacks other portions of the body; the affection demands amputation, but very often the result is durable.

As to the patient, at first he got along very well. The day after the operation, something was given him to eat, for he was doing very well, and he asked for it. On Monday (the operation was performed on Friday) he complained a little, but he had no chilliness, and it was supposed to be owing to his position in the bed. The stump, at the same time, was somewhat swollen and rather smooth and shining, but this was not objected to by M. Nélaton; he said that he had noticed that those patients who experience some apparently unfavorable symptoms on the part of the stump itself, are those who are least affected with the symptoms he dreads so much, of purulent affection. On Monday night the patient had a chill; on Tuesday, he had no repetition of it; but it was a symptom of purulent affection that caused much anxiety. The wound was washed with tincture of iodine, and good diet and strong wine were ordered for the patient.

On Saturday the man died, after presenting all the symptoms of purulent infection; there were signs of metastatic abscesses in the lungs, and he had complained, above all, of a stitch in the side near the heart; he had spit some blood. At the examination of the body, an abscess was found in the lungs near where the man had complained of pain; on opening it pus was found, and around it there was a peripheric pneumonia. Scattered through the lungs were found small cretaceous masses, and what is remarkable, they were enveloped in pus.

M. Nélaton was very much affected by the fatal result in this case; things had come to such a point, he said, that really he was forced to ask himself the question, whether, morally, he ought to undertake such operations in his hospital; and it was not the only one in Paris where the mortality was so frightful; radical reforms were needed in all. Of all the cases operated upon, by amputation, in the preceding twelve months, only two had been saved.

Upon the anatomical pieces, in this case, an instructive experiment was made. Dupuytren, and his school, teach that a ligature should not be applied to an artery in a suppurating wound. M. Nélaton took a fine thread, and the vessel could not be cut by it, though it had remained bathed in suppuration for more than a week. *Arteries in suppurating wounds may be tied;* they can support a ligature as well as any others; the two coats are divided by the thread, and the third resists, as it always does.

December, 1853. A man, fifty years of age, quite robust, from the country, came to the hospital, for an affection of the knee. Of the antecedents, in this case, M. Nélaton did not speak; he thinks it best, he said, not to encumber his remarks too much with what is, most generally, useless.

The patient said that, three years before, a small tumor had formed at the internal face of the knee. When first noticed, it was as small as the end of the finger; and when asked to point out the spot where it was situated (for it is of importance to know this), he indicated, as well as could be judged in the existing condition of things, the lower part of the internal condyle of the femur. At first, this tumor increased slowly in size; in the course of the first twelve months reaching the volume of a hen's egg; since then, its growth had been more rapid; as a reason for which, he assigned several falls and contusions, but to these M. Nélaton thought no importance was to be attached.

At the time he came to the hospital, at the internal portion of the right knee was a tumor six inches in length, and nearly five in breadth, from one side to the other. It turned about half around the knee, extending from the internal border of the patella around to the biceps muscle. Upwards, it extended four inches above the line between the femur and the tibia, and it went down over the tibia as far as where the sartorius is inserted. In many places, the fingers could be passed under this tumor. The very greatest pains were taken to see if it only covered the tibia, or came out of it; for some time, M. Nélaton believed that it arose from that bone, but afterwards he concluded not. The first question to be settled, of course, was whether the movements of the tibia were communicated to the mass. Although the tumor moved with the bone, yet it seemed as if there did not exist a perfect correlation in the movements; when the leg is flexed on the thigh, a slight rotatory movement can be impressed upon the leg, and it seemed, here, as if this could be executed without disturbing the tumor. Again, the prolongation of the tumor in the popliteal space was contrary to such a supposition, for such a prolongation would not come from a tumor arising from the anterior part of the tibia. The tumor, therefore, had its origin from the internal face of the condyle of the femur.

The integrity of the articulation, seen in this case, is what is usually observed.

The mass was lobulated; in some places it felt as if there were many tumors agglutinated together. It did not have the same consistence everywhere; in some parts, above all at the circumference, it was firm; in the centre it was softer, and then at the internal face of the condyle, where the patient had first observed it, it was evidently fluctuating. There are some *tissues* which are fluctuating; a testicle in its physiological state is fluctuating; and there are pathological tissues which are fluctuating.

At the commencement, the patient only had a feeling of numbness about the tumor; afterwards, he had lancinating pains; of late, the pains had increased, and, at the same time, the skin had become rosy and smooth.

This tumor, M. Nélaton said, was an encephaloid tumor; one in which micrographs would very probably not find what they esteem to be cancerous elements, but those found in fibro-plastic tumors.

If operated upon, the chances were very great that it would not return; it was not certain, but very probable. If not operated upon, it would become larger and larger, the skin would be perforated; ten days after that the ulceration would be frightful, with hemorrhage and sanious exudation, and the patient would rapidly sink. In six or eight months, if abandoned to himself, M. Nélaton thought, the man would die.

The only operation to be performed in the case was the amputation of the thigh; the extirpation of the affection was not to be thought of, for the roots would be left in the bones; it was impossible to remove it without removing the bone itself. But amputations succeed horribly in his hospital, M. Nélaton said, and he believed they did no better in the others in Paris, only the surgeons would not confess it. In addition, at that time, the cholera was attacking the patients. The best advice he thought he could give to the man was, to go back to his native place, and to persuade the physician of the village to remove the limb for him.

The preceding case of cancer of the bone was supposed to be one of the third form of that affection, in which there seems to be a considerable rarefaction of the osseous tissue, in the cells of which the cancerous matter is deposited. At his next lecture, M. Nélaton brought a fresh pathological specimen, showing, he said, another form, in which the cancerous matter penetrates into the bone, and causes a loss of osseous substance.

This specimen was an amputated thigh from a patient operated upon in his private practice. The patient was a young man twenty-two years of age, who had been treated for a syphilitic affection of the upper part of the tibia, until M. Ricord and M. Nélaton were called in, in consultation, when they recognized the affection to be a variety of cancer of the bone. The disease had then lasted only three months, and already the bone could be bent in all directions, as if formed of a soft elastic substance. The pains were so intense that the patient had not slept for thirty days. The tibia only was affected, but in the most superior portion.

The amputation of the thigh had been practised as low down as possible, as it is better for an artificial limb, and also for the chance of cure. The incision in the soft parts could be seen to have been made immediately above the patella.

Proceeding to the examination of this specimen, when the knee-joint, whose movements had been unaffected, was opened, the articulation was found intact; no disease had penetrated into it. If some had been found in the articulation, it would have been propagated by parts of the tibia not provided with cartilage, which prevents the extension of the cancerous affection. When a vertical section of the tibia was made with a saw, the affection was found not to be cancerous, but one of *erectile tumor of the bone*.[1] In the case of this young man, there had never been any pulsations, nor any souffle, and this had made M. Nélaton believe that the tumor could not possibly be vascular, but must necessarily be encephaloid. The diseased portion of the tibia, when the bone was thus sawn vertically in half, appeared to be about five inches long, in the direction of the long diameter of the bone, and three and a half wide. The affection, M. Nélaton said, was between erectile tumor and what is called multilocular cyst of bones, in which sometimes the contained fluid is sero-sanguineous. In the work of Scarpa, an exact representation of what was here seen can be found.

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[1] See page 60.

Of the Bones at the Shoulder.

April, 1854. A young girl, seventeen years of age, from the country, whose health had always been very good.

Five months before, *without any known cause*, she felt pain at the shoulder; at that time, there was no sign of inflammation, no heat, no redness, nor swelling. A physician to whom she went, thought the affection to be rheumatism. It is important to note this, for in analogous cases this almost always occurs. Soon after, a tumor commenced to show itself, and the point of origin the patient indicated was the middle of the deltoid region. It grew very rapidly, and, at the time of entering the hospital, it was enormous.

At that time, an enormous tumefaction of the scapular region existed, which invaded the lower part of the neck, the upper part of the breast, and a part of the arm. Only about one and a half inches of the most internal portion of the clavicle could be distinguished. The integuments covering this swelling were altered. There were three kinds of alteration: from extreme distension, which had produced the marks seen in pregnancy; from venous enlargements; and, besides, from a redness, and one of quite a deep tint; moreover, very small vesicles could be found. The whole looked like a skin about to burst open from extreme distension and from inflammation. The consistence of the mass was firm, but in some portions, and, above all, at the point of origin, there was an obscure fluctuation; the mass was not yet in the state of fluctuation it sometimes reaches. As to movement at the articulation, there was none.

This was a type case, a case of *diagnostic à distance*, of a cancer commenced in one of the shoulder-bones. It was impossible, at that time, to see where the point of origin had been; but the patient said it had commenced in the upper extremity of the humerus; and again, there was another sign—the humerus in that part was transformed into encephaloid matter. Just where the patient said that the disease had commenced, the humerus moved, bent in every direction; it had lost there the resistance of bony tissue.

It is remarked above, that the error is a common one, of mistaking this disease for rheumatism. In the course of the last twelve months, M. Nélaton had seen two cases in private practice, and in both the most capable men were consulted, and both were called rheumatism. When he had seen them himself, there was mobility of the bone, which does not permit any mistake to be made.

As to the treatment of this case, M. Nélaton said, he did not hesitate to say that the surgeon must know how to resign himself to do nothing; even a puncture would only hasten the ulceration. An extirpation would, of necessity, be incomplete; a great part of the clavicle, and of the scapula were affected, and the disease was around the large bloodvessels. If the disease were only in the humerus, or if the acromion were not much affected, it could be removed. The only thing to be done was to palliate, and to try to encourage.

The girl returned, in a day or two, to her native place, in the country.

Of the Bones of the Cranium.

April, 1854. A woman, of fair complexion, twenty-eight years of age.

Two years and nine months before, she had pains in the head, chiefly in the parietal region. Consulting a physician, he thought them neuralgic; but continuing, he made search, and he found a tumor. This tumor had grown so as to have acquired a large size. The same thing was repeated for other parts of the body, for the clavicles, and the sternum. The character of these pains was much insisted upon, in questioning the patient; but it was impossible, then, to learn if they had been principally nocturnal. They had been always increased by the touch, by pressure (the character of osteocopic pains, those preceding the formation of syphilitic exostoses).

When she entered the hospital, this patient had four tumors on the cranium. One was situated on the left side, near the summit of the parietal bone. Its base was at least two and a half inches in diameter; its elevation was at least half an inch. The base lost itself insensibly in the neighboring parts; the centre was soft and fluctuating. A bony circle could be felt at the edge, as if there was a perforation of the bone. This tumor was not reducible; prolonged pressure did not make it disappear; there was no pulsation, either arterial or venous; cough did not make it project, as it does a mass from the interior of the cranium. On the other side of the head, at about the same distance from the sagittal suture, and in a line parallel to it, were three other tumors, smaller than the first, but similar in other respects. As to the functional troubles, she felt pains, just as at the commencement, only much more rarely—pains that came and went, like neuralgia; there was nothing to indicate any affection of the brain.

The clavicles were larger than normal, and rough, just as when there are syphilitic exostoses; this was true also of the anterior part of the sternum.

The diagnosis, in this case, was very difficult. Were these tumors *gommeuses?* There was something like it in their mode of development; for a long time they had been preceded by pains, and pains of a peculiar character. And yet, a treatment by the iodide of potassium had been made, and the tumors of the cranium had not varied; those of the clavicle had ceased to be painful. It was to be asked, therefore, if all these tumors were of the same nature. When, in the same individual, you find several tumors, they are, generally, of the same nature; but they should be affected by the same treatment, and here they were not. It may be remarked here, that a syphilitic exostosis, which at first is formed by a cellular tissue, containing a great number of bloodvessels, acquires more density as it becomes older, and at last its texture becomes eburnated: when it has reached this point, the resorption is impossible; the tumor remains stationary, and the only effect of treatment is to combat the osteocopic pains.

M. Nélaton remembered having had a case precisely like this present one. He believed it syphilitic, and treated it as such; the treatment had no effect, though long persisted in. When the disease is syphilitic, the effect of the proper treatment is wonderful. He watched the patient every day, when one day the tumor became pulsative, and the next there was a propulsion outward during efforts. There could be no doubt but that the tumor at first had been exterior; the bone had been destroyed, the dura mater reached, and the motions of the brain were communicated. In this case, also, there were four tumors, as in the present instance. Now, a tumor that perforates the cranium, can only be cancerous—what are now called fibro-plastic; but they are the same.

A mercurial plaster (*de vigo*) was applied; for patients must have something done for their affections, no matter what they may be. To his surprise, M. Nélaton said, the tumors disappeared, and the man went out with holes in his head, but the tumors were gone. He was soon afterward brought to the hospital, asphyxiated. At the examination of the body, an encephaloid tumor was found in the humerus, similar to those that had existed on the head; the cranium was perforated, of course, as was said, but there were no remains of any tumor.

In this patient, M. Nélaton said he thought the tumors of the clavicle to be syphilitic, but those on the head to be cancers of the bone. The woman did not remain in the wards.

Many tumors of bones removed as cancerous, are found by examination to have for their principal element *myeloplaxes, the lamellæ with many nuclei;* others, arising from the *periosteum alone,* are purely fibrous and fibro-plastic. Both are, consequently, homeomorphous.

The greater number of the tumors known as epulis, are composed of myeloplaxes, accumulated in great quantity and accompanied by fibro-plastic elements. They often arise from the surface of the bone (not the periosteum), and make a great projection, though only adhering to the surface; the osseous tissue is so little attacked, that they seem to come from the periosteum. Why the lower jaw is particularly affected by this affection, it is difficult to say. It has also been seen in the tibia, the femur, and the small bones of the tarsus and carpus. Facts show, at least until the present time, that when removed, and no diseased tissue is left behind, the disease does not return. We do not know why it came at first, nor why it does not come a second time, but it is an experimental fact, a question of experience; experience has shown that lipomatous tumors do not return, and yet, adipose vesicles are found everywhere.

Myeloplaxes, so called from their flattened form, are bodies found in the marrow of bones. It has been found necessary, in general anatomy, to adopt occasionally a new word, but far less frequently than in chemistry. In addition to these elements, the marrow contains medullo-cells, granular amorphous matter, capillaries, and adipose vesicles. In the different varieties of marrow, and in the different affections to which it is subject, these different elements predominate, as the medullo-cells in the *fœtal*, the granular amorphous matter in the *gelatiniform*, and the adipose vesicles in the *fatty*. By far the most important of these elements, however, in pathology, are the myeloplaxes. It must be recollected that the marrow is contained not only in the cavity of long bones, the cellular cavities of their extremities, and the diploe of the flat bones, but even in the vascular canals, or the canals of Havers.

The myeloplaxe is characterized by a very variable form and volume (from 0.020 millimetre to 0.100 millimetre, or $\frac{1}{1250}$ to $\frac{1}{250}$ inch), flattened or polyhedric, with edges generally irregular or even dentated, pale, thin, or thick and dark, composed of a finely granular mass sprinkled with from two to thirty ovoid nuclei. The nuclei are ovoid, and about 0.008 millimetre, or about $\frac{1}{3000}$ inch, in their greatest diameter; that is to say, about one-half smaller than those of cancer. They sometimes contain a nucleolus, and, when it exists, it is smaller than in cancer.

These bodies have a grayish tint, from the abundance of the molecular granulations. Acetic acid has but little action upon them; it makes them rather paler.

In the normal condition, myeloplaxes are found more abundantly in the marrow of the diploe and of the spongy tissue, than in that of the long bones. They are found principally adhering to the bony substance itself of the canal, or of the areolæ filled with marrow, and they are moulded upon the irregularities of this substance. It is known positively that there is no medullary membrane in bones; it is one of the creations of anatomists.

There is no other cellular and fibro-plastic tissue than that forming the adventitious tunic of the largest vessels.

These flat bodies, with many nuclei, are much more numerous, proportionately of course, in the fœtus than in the adult. This is an interesting fact, for long ago it was maintained that many diseases were a return to the fœtal condition. This has always been exaggerated, but it is not absolutely false. The same thing is true of the fibro-plastic elements; they are much more abundant, proportionately, in the fœtus.

CHAPTER XI.

INJURIES OF THE HEAD.

FEBRUARY, 1853. A man who, in a fall from a considerable elevation, had received a wound of the head. On the forehead, at the left side, there was a solution of continuity in the integuments, with irregular and contused edges; at the bottom, the bone was felt to be denuded of its periosteum. On the external part of the superciliary ridge there was another wound, confined there, however, to the integuments. The eye was untouched; and in the eyelids there was no effusion of blood.

M. Nélaton spoke of this case in order to prevent a too favorable prognosis being given in patients with such injuries. It was not unlikely that, in a few days, the whole head would be covered with erysipelas, and the death of the patient might be the result. This erysipelas, though it generally terminates by resolution, may go on to suppuration, and then purulent collections are seen to form in the subcutaneous cellular tissue, which is detached in grayish, gangrenous flakes. It is very rare, then, for the pericranium not to be affected, and for a necrosis of greater or less extent not to follow. In such cases the patients often die, worn out by the abundance of the suppuration, or carried off by an inflammation of the brain and its membranes. Sometimes, in consequence of this erysipelas, meningitis and intercranian effusions are seen to occur, with separation of the dura-mater, either by a propagation of the inflammation from without inward, by numerous vascular communications which exist between the integuments and the dura mater, or through the orbit, or else, as some suppose, by contiguity of parts.

The wound must be scrupulously cleaned from all foreign bodies; simple, unirritating dressings should be applied to it, and the general treatment must be most energetically antiphlogistic.

In addition to the wound of the integuments, in this case, as said before, there was a denudation of the bone. This, as a general rule, is not an affair of very great importance; it was very possible that the parts would join together and heal as if the bone had not been laid bare; the exceptions to this are, even, very rare. And this is seen, both when the denudation is immediate by the fall or the blow, and when it is consecutive. In the first instance, you not only have no exfoliation, but you generally see union by first intention; in the second, when the denudation is the result of a succeeding inflammation, of a mortification of the periosteum, where the denudation is consecutive, the bone, denuded, has been bathed in pus, and must have participated more or less in the neighboring inflammatory action; in spite of all that, the rule is that it gets well without exfoliation. In consecutive denudation, if the wound unites by second intention, it is by the following process: The bone in the neighborhood of the part laid bare is evidently inflamed; it presents on its surface a large number of red spots, due to a very great vascularization of its tissue; at these spots the bone is traversed from within outward by fleshy granulations, forming, on its surface, a granular, pyogenic membrane, by the intervention of which secondary union is effected.

The wound healed without difficulty, and the man left well.

December, 1853. A young man, a blacksmith, with erysipelas of the head and face, was brought to the hospital.

It was difficult to obtain information about him; he said himself, that he had been struck on the forehead by the hammer bounding back from the anvil. He had received this blow twelve days before; the small wound formed did not heal, but, forced to work, he had continued to do so, until an erysipelas developed itself.

When he came in, there was a small wound to be seen just above the eyebrow on the left side. The whole of the face was red and swollen, as far as the base of the jaw. On the head there was no redness, but there were signs quite sufficient to show that the erysipelas extended there. All parts covered by hair are exempt from the redness, why, M. Nélaton said, he did not know;

but there are two signs which cannot deceive; by pressure with the finger, a perceptible depression is left, and again, the touch causes pain. It is strange, but true, that when the head is bald, as from age, the redness makes its appearance. Beside these local symptoms, there were general symptoms of febrile constitutional disturbance.

These general symptoms quite promptly disappeared, by the use of antiphlogistics, and the redness of the face, also, had almost gone, when another symptom made its appearance; the patient fell into a state of most marked intellectual depression.

This, M. Nélaton said, surgeons would formerly have regarded as an inflammation of the internal parts of the cranium. The pathology of the condition he did not desire to discuss, but practically it was important to notice, for it is one not at all serious; he had always seen it to terminate well in eight or ten days.

The patient was asked if he had a desire for brandy, and not without reason, M. Nélaton said, for the *ouvriers* drink to excess,[1] and it seemed as if the want of it had something to do with the man's condition.

Good diet and strong wine were given to the patient, and although his condition had really seemed to be most serious, he went out quite well at the end of a very short time.

June, 1852. A man, a glazier, was received in the wards, with two injuries, one of which, at least, was extremely serious. The man had fallen from a third story upon his head, the edge of the pavement striking the forehead, one and a half inches above the eyebrow. He was carried senseless to an apothecary's, and afterward, his consciousness returning, to the hospital.

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[1] Whatever may have been true in times gone by, and whatever travellers may say to the contrary, at the present day, this statement of M. Nélaton is most certainly correct, and the working class, the *ouvriers*, in France, do drink to excess. Of this, any one can soon convince himself who will visit those portions of Paris where they are congregated, particularly on Monday evening. This is not only true of Paris, but there is good reason to believe of France, quite generally. The great check upon them is their poverty. The indulgence of the natural appetite for stimulus is, of course, not so apparent in countries where the people are very poor, and wine is cheap, but the French ouvrier, when he can procure it, prefers *eau de vie*, and drinks it to excess, drinks it as his fellow does, all the world over, until he forgets his miseries.

It is not by cheapening the price of wine, that drunkenness is to be banished from a state, any more than by prohibitory laws, but by abolishing misery.

Above the left eyebrow was a transverse wound, two and a half inches long, presenting all the characters of a contused wound; the bone was completely laid bare. In the centre, upon the bone, a slight depression was seen, and five small fissures, about half an inch in length, radiated from it. There was a tumefaction of the eyelids on the left side, with ecchymosis under the lid, without there being any effusion in the sub-conjunctival cellular tissue; there was a slight flow of blood from the nose, and also from the right ear—the ear of the opposite side of the one struck. The ideas of the patient were very confused.

The value, as a sign of fracture at the base of the cranium, of a running *of blood* from the ear, is not so great as that of a serous discharge, but it is of a certain value. Moreover, the morning after the entrance of the patient, there was some blood in the sub-conjunctival cellular tissue, which M. Nélaton believed came from deeply in the orbit.

It is well established, even when the bones of the cranium are not broken, that the brain is contused, immediately beneath the point struck; and if fracture by *contre-coup* be rejected, it is impossible to reject cerebral contusion by *contre-coup*.

M. Nélaton believed that this patient had received a contusion of the brain. In these cases, a formidable train of symptoms appear in the course of a few days—Dupuytren fixes six days: symptoms of encephalic inflammation; fever, delirium, convulsions, and then paralysis, more or less complete, of sensation and of motion, and finally death takes place, from the eighth to the tenth day.

The day the patient received the fall, he was bled from the arm three times; the next, thirty leeches were applied to the mastoid region, two at a time, so as to keep up a flow of blood during the greater part of the day; in addition to this, on account of the fracture of the humerus,[1] twenty-five leeches were applied in the neighborhood of the elbow. Calomel, in a purgative dose, was administered, and ice, contained in a bladder, suspended from the iron framework of the bed, was kept constantly applied to the seat of injury. On the third day, blood was again taken, but not in so great quantity. On the fourth day, there was no trouble in the organs of the senses; the pupils had their normal dimensions, and the man moved his limbs perfectly well. As far as the circulation was concerned, there was nothing remarkable. Only one symptom of cerebral affection still existed; the man slept almost constantly when left to himself. Although the patient seemed to be doing so well, M. Nélaton was still anxious about him.

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[1] See page 158.

The man recovered.

December, 1852. An old man, who for many years had sold thèses before the School of Medicine, was carried into the hospital immediately after falling from a window upon his head. There was total unconsciousness, a complete relaxation of all the limbs, with the exception of a slight rigidity of the right arm, and the respiration was stertorous. In a few hours he died.

The autopsy showed a large clot of blood between the dura mater and the brain, which is its usual situation. There were innumerable small effusions of blood, as large as the head of a small pin, disseminated in the cerebral tissue.

These small miliary effusions might be confounded, by one who was not apprised of it, with the small drops of blood which show themselves at the orifices of the bloodvessels, when a layer of cerebral substance is removed by the knife. It is easy to avoid making any mistake; for, in the first case, the little clot of blood can be removed with the point of a bistoury, while in the second, it is some fluid blood that shows itself at the extremity of the vessel, and, moreover, after its removal it can be made to reappear again and again, by slightly pressing the cerebral pulp.

May, 1852. A young man, a student of medicine, fell from a window in the second story; striking the ground with his right knee, by a movement of *bascule*, he was projected afterwards violently upon his face. He was carried to the hospital in a state of complete insensibility, which lasted for some hours. A number of slight excoriations of no importance were found, but there were other injuries, which were more serious.

As regards the head, above the eyebrow, on the right side, there was an excoriation of the skin, and just there was a soft depression, surrounded by a hard, and angular edge. It could readily have been mistaken for a fracture with depression, but there was none. In doubtful cases, this mode of exploration should be employed. Exercise on the hard edge a sustained pressure with the finger, and if it is owing to blood infiltrated in the cellular tissue, it will be made to disappear. Moreover, press with the finger in the centre, the effused blood will be forced from under it, the finger will reach the bone, and it will be seen not to be fractured. In these bloody tumors of the scalp, it has sometimes happened that an artery has been wounded, and its pulsations have been mistaken for those of the brain; nothing is more easy than to avoid being led into error in this case, for by compressing the artery, supposed to be wounded, the pulsations are arrested. Besides, the encephalic mass presents two movements, one of the circulation, the other of the respiration; again, by making the patient cough, the swelling will necessarily be made to project, if it be of the brain.

There was another sign that might appear to indicate a fracture; the two lids presented an ecchymosis; but it had been produced by an exterior cause, and the blood did not come from the interior of the cranium, for when the blood comes from within the skull, the sub-conjunctival tissues are always first injected; here they were not. There was a fracture of the bones of the nose, and this fracture could have caused this ecchymosis, which existed both on the right side and on the left. There was also emphysema, explained by the fracture of the nasal bones, the tearing of the Schneiderian membrane, and the forcing of the air into the cellular tissue by cough, or violent expiration.

In addition to the other injuries, there was a fracture of the right femur, a little below the middle third; also a fracture of the patella, without, however, any separation of the fragments, for the muscles were perfectly relaxed; thus, even if it had been produced by violent muscular contraction, the fragments were still in contact.

As regards the treatment of this case, M. Nélaton said it must be admitted that surgeons have become extremely timid, in the use of bloodletting, if their practice was compared with that of their predecessors; and he was inclined to think himself, that, in injuries of the head, it was employed with too much timidity.

In the first thirty-six hours, this patient was bled copiously four times, and, at the same time, leeches were applied to the mastoid region, four every hour, until thirty had been applied. The man, M. Nélaton said, was not about to die from anæmia, but from cerebral inflammation. Powdered ice was applied to the head, in a bladder, suspended as usual, and, in order to act upon the intestinal canal, a large dose of calomel was given in a single dose. During the night, the patient was allowed to rest undisturbed, and the next day ten more leeches were applied in the same region.

Under this treatment, the pulse lost its fulness, it became almost filiform, and counted one hundred and thirty pulsations in the minute. As respects the intelligence of the patient, the brain acted with slowness, but its functions were not abolished; there was no delirium, no convulsion, no paralysis, not sharp pain in the head.

The next night there was some delirium, and the man threw himself about the bed; in the morning, he was in a state of deep prostration; the condition of the pulse was very alarming, scarcely perceptible, and too rapid to be counted, and there was subsultus of the tendons. Although almost certain that he would die in the course of the day, from the meningitis, M. Nélaton ordered the patient's head to be shaved, and a large blister to be applied. It may be remarked here, that after the application of a blister to the head, those large bullæ do not form, which are observed in other parts of the body; the surface becomes covered with a grayish layer, and by pulling away the epidermis, the plastic exudation will be seen.

In the course of the day, the fourth of the accident, the patient died. No autopsy was permitted. He died, M. Nélaton said, of traumatic encephalitis, consequent upon a contusion of the cerebral substance. He did not believe that there had been a fracture of the cranium. In injuries to the exterior of the head, there is communication of the motion to the contents of the cranium, and the cerebral mass is contused. Sometimes it undergoes a kind of attrition. In some cases, the contusion is in the opposite part of the head to the one struck; there is contusion by contre-coup.

There is, perhaps, no more important subject in surgery than that of wounds of the head; on this account, and as the above cases are not sufficient to give an idea of the views of M. Nélaton and those generally received in France, it may be well to add something to what is contained in them.

Fractures of the skull have been distinguished as direct, and by contre-coup. Observation authorizes the admission of the latter, but it is necessary to recognize with M. Aran, who has written in the *Archives Générales de Médecine*, for 1844, a celebrated memoir on fractures of the base of the cranium, that they are much more rare than is generally believed.

M. Aran argues most strongly against fractures by contre-coup. In his opinion, such a fracture is nothing but a continuation of a direct fracture, and not only that, but in the most direct, the shortest way. These are the results he has obtained in a series of experiments:—

1st. He never observed a fracture of the base, without fracture at the point struck; in other words, he never observed a fracture by contre-coup of that region.

2d. Fractures of the vault of the cranium generally reach the base, even through the sutures, which in no wise hinder this propagation.

3d. These fractures reach the base by the shortest route, that is to say, by following the curve of the shortest radius.

4th. They are generally limited to certain regions, and have a particular direction, that is to say, fractures consecutive to blows or to fractures of the frontal region, and at the superior stage of the base, namely, at the roof of the orbit, and at the ethmoid region; those of he occipital region, at the inferior stage, namely, the cerebellar fossa; those of the temporal region, at the middle stage; and, lastly, fractures that commence at the sinciput can follow either of these three directions, but they go most generally to the middle stage.

5th. These fractures coincide sometimes with independent fractures of the base (that is to say, without communication with the fracture observed in the part struck), but only in cases where there has been a very considerable concussion, and very multiplied fractures.

Of fractures situated in the second stage of the base, or in the petrous portion of the temporal bone, there are five or six specimens in Dupuytren's museum, and in all of them fracture is on the anterior face, and running in the direction of the long axis. There is another fracture, but very much rarer, which is perpendicular to this axis. M. Aran has perfectly explained this; he has shown that when an individual is struck on the temporal bone, the petrous portion is fractured parallel to its axis; when the blow is upon the occiput, the fracture is perpendicular to it.

The ecchymosis, the effusions of blood, and the serous effusions that follow fractures of the base of the brain, are signs of the highest importance; sometimes, indeed, almost pathognomonic.

An ecchymosis in the mastoid region is the result of a fracture parallel to the axis of the petrous portion of the temporal bone.

The ecchymosis of the eyelids, a symptom first pointed out by M. Velpeau, is the result of a fracture situated in the anterior stage. In order that this ecchymosis be valuable, its appearance must be preceded by another sign of equal importance, the ecchymosis of the ocular conjunctiva. The blood having arrived in the ocular cavity, is infiltrated with great facility into the loose and lamellated cellular tissue, surrounding the globe of the eye, and this cellular tissue communicating directly with that under the conjunctiva, the slightest traces of blood will appear in the latter. Now, as the aponeurosis, which is inserted by its great circumference to the whole anterior edge of the orbital cavity, and by its small to the tarsal cartilages, which it seems to continue, establishes a kind of barrier between the subconjunctival tissue and the cellular tissue of the eyelids, it follows that these will present an ecchymosis only when the blood shall have traversed by imbibition this fibrous lamina, but then the infiltration will only take place consecutively, and from within outward.

An effusion of blood from the nose, the ear, or the mouth, at the time of the injury, without being a decisive sign of fracture, is, nevertheless, of great value. What gives importance to these hemorrhages is their continuance, and, above all, their long duration. When the flow of blood is due to the lesion of external parts, it is not abundant, and soon ceases.

An effusion from the nose occurs almost always with ecchymosis of the eyelids.

When the flow of blood is from the ear, the fracture is one parallel to the axis of the petrous bone.

When from the mouth, there is probably a double fracture, both petrous bones being fractured parallel to their axis, and the fracture being continued through the body of the sphenoid.

A flow of serum, or of a colorless liquid, from the ear, or even from the nose, is one of the most important signs of fracture at the base of the brain. M. Laugier was the first, in France, who observed this, in 1835, and remarking that first blood came away, and afterward a colorless liquid, he supposed that it was the serum of the blood, flowing away after its coagulation. M. Chassaignac thought the discharge to be owing to the tearing of some veins, or the opening of a sinus, which allowed the serosity to leak out. The chemical analysis of the liquid suffices to show the falsity of both these opinions, as it does not contain albumen, or but very little. The generally received opinion now is, that it comes from the cephalo-rachidian liquid, and this opinion is accepted by M. Nélaton, not only on account of the inability of the other hypothesis to explain this singular phenomenon, but, moreover, for the following reasons:—

1st. The chemical analysis of the liquid discharged is the same as that of the cephalo-rachidian liquid.

2d. The facility and rapidity with which this liquid is reproduced after it has been evacuated, which explains, to a certain point, the continuance of the discharge, and its quantity.

3d. It must be remarked that, in the reported cases, where the anatomical lesions have been minutely noted, they are found to be such as could permit the cephalo-rachidian liquid to escape.

4th. When the lesions are produced on the dead body, the cephalo-rachidian liquid can be seen to leak out.

5th. In two cases, where a colorless liquid has flowed from the nostrils, the anatomical lesions have been found favorable to the escape of the cephalo-rachidian liquid. In one case, the meninges were torn at the level of the sella turcica, and of the prolongation which the arachnoid sends around the infundibulum. Opposite to this tear, the base of the cranium showed a fracture penetrating into the sphenoidal sinuses. The mucous membrane, lining the sinuses, was torn. It is evident that the cephalo-rachidian liquid could easily escape, and, penetrating into the sinuses, which open into the superior meatus on each side, be poured out of the nostril.

But if, in some cases, an opening has been shown by which the cephalo-rachidian liquid could be discharged, it must be confessed that in others, all the researches made, in order to discover it, have been fruitless. It has been admitted by some surgeons, that this liquid traverses the envelops of the brain by exosmose, but experiments, repeated with every necessary precaution, have shown nothing to warrant this opinion.

The question, therefore, as to the origin of this serous or colorless discharge, must be considered as still unsettled. Unhappily, what we most certainly do know, is the prognostic signification. Although some patients undoubtedly have recovered, they often die before the end of a week. Whether death is caused by the discharge or the fracture, it is hard to say, but it is probable that the discharge adds to the dangers of the fracture, already most serious of itself.

The treatment of the fractures of the cranium, by the most eminent French surgeons, so far as the employment of the operation of trepanning is concerned, agrees with that usually taught here. The following doctrines are those professed by M. Nélaton.

These fractures are met with in two very different conditions: 1st. Without a wound of the soft parts exterior to the bone, communicating with the seat of fracture; 2d. With such a wound.

In the first place, whether there be depression of the bone or not, the surgeon must abstain from every operation, if there be no alarming symptom. The treatment will then be purely preventive. Experience has shown that, even where the fragments are depressed, cure can take place, whether the fragments, little by little, pushed back by the rising up of the brain, have resumed their normal position, or even if they have persisted to make an abnormal projection into the cranial cavity.

But what must the surgeon do, if these fractures be accompanied by cerebral symptoms? Most surgeons advise trepanning, if some local sign exists in the cranial region, enabling them to recognize in what point the direct cause of these symptoms is to be found. This opinion M. Nélaton does not altogether accept; in fact, an identical treatment should not be applied to accidents so different as those of compression of the brain, and of encephalic inflammations, which can both follow a fracture of the skull. If the symptoms of compression show themselves, paralysis and coma, taking place without fever, a short time after the injury, it is certain that the application of the trepan would afford a means of evacuating the effused liquid, and of elevating the fragment. But has not this operation, slightly dangerous, if the action it exercises upon the bone be alone regarded, other dangers? No one is ignorant of the serious character of fractures, when they communicate with the external air; the dangers without being equally great, perhaps, are not less real in solutions of continuity of the cranium, than in those of other bones. This circumstance would already make the surgeon dread the action of the trepan, but the opening of the sanguineous collection in the cranial cavity, the opening of the arachnoid, if the dura mater is torn, constitute complications exposing to greater dangers than those resulting from compression of the brain. Compression of the brain, when not excessive, is not of itself a cause of death; it only becomes fatal by becoming the starting point of an intercranial inflammation. Its symptoms can improve, for the effusion of blood can be absorbed, and the fragment can be raised up, as was said before. And, moreover, is it not a fact, constantly witnessed, that the brain by degrees becomes accustomed to the presence of the compressing agent?

If the symptoms of encephalic inflammation occur—febrile delirium, contraction of the muscles, convulsions, appearing several days after the injury—if this inflammation has been caused, and is still kept up, by the presence of a fragment driven into the brain, in this case the trepan would be useful. It is almost useless to say that the operation is only advised in cases in which a local sign exists, indicating the place where the presumed cause of the symptoms is to be found.

If there is a wound of the integuments communicating with the seat of fracture, the course to be pursued by the surgeon is more clearly marked out. Here, he is no longer withheld by the dread of making this fracture, or the effusion of blood, communicate with the exterior, and the trepan cannot change the character of the wound, and aggravate the condition of the patient. As far as the injury it does the bone is concerned, the action of the trepan is of very slight importance, and it only remains to consider under what circumstances its action would be beneficial. It is evident that if the fracture is not complicated by any bad symptoms, and if there is no depression, the operation could remedy nothing; but if any symptoms of compression exist, notwithstanding the absence of any apparent depression, the surgeon should not hesitate to apply the trepan. If a depression exists, the fragments must be raised up, or even the trepan applied, although there be no bad symptoms, for the surgeon has reason to suppose that fragments driven towards the brain could become the cause of an inflammation, which trepanning could prevent.

Concussion and contusion of the brain are the results of the action of a blunt body upon the head, whether the head strike a resisting surface, or whether it be struck by the body. It may also result from a shock experienced by other parts of the body, as by a blow upon the chin, a fall upon the feet, the knees, or the breech.

Concussion of the brain, according to some surgeons, is a *shaking together* of the central substance. To support their opinion, they quote the fact of a criminal, who, to escape his execution, committed suicide by throwing himself head-foremost against the wall of his cell. No lesion was found at the autopsy, but *the brain no longer filled the skull.* But this must be doubted; this diminution of volume supposes that a vacuum can be formed in the cavity of the cranium, a supposition not to be admitted; and, moreover, in making an autopsy, the cephalo-rachidian liquid that bathes the surface of the brain can flow away, and in such a manner as to make you believe that the brain is collapsed and has diminished in volume. There is a molecular shaking, but there is something else. Sanson was the first to point out an alteration of the cerebral substance mentioned in the preceding cases, which consists in small effusions of blood, as large as the head of a very small pin, found disseminated throughout the cerebral mass.

When it is considered that this alteration is constantly found in cerebral contusion, is it not right to look upon concussion of the brain as but a feeble degree of contusion? This is the opinion of M. Velpeau, and Cruveilhier says: "I must postpone my belief in the facts of Littrer (the suicide above mentioned). No anatomical fact demonstrates that death by the brain can be the result of a concussion pure and simple, without contusion of that organ." M. Nélaton, however, calling attention to the fact that it has only been possible to study the lesion proper to concussion in the worst cases, the others having terminated happily, is disposed to admit that, in certain cases, the cerebral substance, submitted to a sudden and violent shaking, presents no alteration appreciable to our means of investigation.

In regard to the mechanism of concussion, it is explainable by phenomena observed in physics. If a plank be held in the hand by one end, and the other be struck with a pointed hammer, a hole will be made at the point struck, without anything being felt at the other end of the plank. But, on the contrary, if a large flat-headed hammer be used, no effect will be produced at the point struck, while the plank will break at another place more or less removed; if the plank does not break, the stroke will react upon the hand, and cause a very painful benumbing sensation. If a ball of ivory be let fall upon a flat surface, its diameters are lengthened and shortened alternately.

In a point of view purely anatomical, concussion of the brain ought to be considered as a feeble degree of contusion, diffused contusion of the whole encephalic mass. But there are other cases where, under the action of contusing bodies, the soft cerebral structure undergoes an attrition, more or less serious, and more or less extensive; generally, it is circumscribed. This is the lesion which Dupuytren has studied exclusively under the name of contusion, separating it thus from concussion, with which it has been confounded by almost all surgeons.

A sudden and violent contusion, without fracturing the cranium, can be communicated to its contents, and cause it to undergo a sort of circumscribed attrition which corresponds to the part of the cranium that has been struck, sometimes to a point more or less removed, sometimes even to a point that is diametrically opposite. In some cases, the cerebral tissue presents only a crowd of small miliary effusions, like those spoken of as found in concussion; but instead of being disseminated throughout the brain, these spots are grouped in a circumscribed space. If an incision be made then into the brain, it will be found to have undergone a slight degree of softening. When the contusion is more profound, the cerebral structure is reduced to a sort of very soft pulp, resembling the lees of wine, in the centre of the contused portion. A slight quantity of blood is always found infiltrated into the pia mater, and extending a greater or less distance to the surface of the brain. This is the condition presented when the patients die shortly after the injury. In the contrary case, the cerebral substance surrounding the spot is softened, yellowish, and sometimes infiltrated with pus.

It will be seen, from what has just been said, that concussion and contusion resemble each other a great deal in an anatomical point of view, and even that, in some cases, the cerebral lesion is such that it is embarrassing to assign it its place. In some cases, again, the alteration proper to contusion is found well marked in some parts of the brain, while, in other parts, small capillary effusions are found disseminated, as in concussion. Similar cases do not admit, so to speak, of a differential diagnosis. In cases, however, where the surgeon has to do with one or the other of these alterations, without complication or combination, it is generally possible, and even useful, to establish the diagnosis.

It can be said, in a general way, that contusion is characterized by extreme agitation, disorderly movements, contraction of the muscles, partial paralysis, convulsions, and delirium; concussion, on the contrary, produces drowsiness. At the expiration of a few days, the occurrence of symptoms indicating encephalitis, will be the almost certain index of the existence of contusion; almost certain, for this encephalitis can show itself equally after a concussion, although much more rarely, while, after contusion, it is almost inevitable.

Traumatic encephalitis—inflammation of the brain and of its membranes—for these affections, in their causes, their symptoms, and their treatment, present such similarities that it appears impossible to study them separately—can result from any wound of the head. There are some, however, in which it is almost inevitable, and it is, above all, seen to follow contusion of the brain, and contused wounds complicated by the presence of a foreign body.

The symptoms announcing it, most generally only manifest themselves five or six days after the accident; it has been seen to develop itself after a much longer time, after the patients have resumed their usual occupations, and apparently entirely recovered. If the patient has received but a simple contusion, the bruised part becomes slightly swollen and painful, above all, to the touch. On dividing the integuments with a bistoury, the pericranium is found detached from the bone, and separated from it by a thin, dark-colored liquid; the bone is less red than in the normal state, and, at the expiration of a few days, it resembles a necrosed bone. If, by the trepan, a portion of bone be removed, the dura mater is found separated to an extent about equal to that of the pericranium; it has lost its mother-of-pearl appearance, and is separated from the bone by a purulent liquid. If there had been an external wound, as soon as the pain in the head is felt, it becomes pale and livid, and no longer furnishes a healthy discharge; the pericranium separates itself from the bone, and the same symptoms, mentioned above, are manifested on the part of the bone and the dura mater. If there be, in addition, a fracture of the bone, and a tear of the membranes, the cerebral substance is sometimes seen to project between the fragments.

The general symptoms accompanying this inflammation are very diverse, as may be supposed, for they must vary as the inflammation predominates in the membranes or in the brain, with the part contused, &c. &c. In these symptoms, two periods are to be distinguished, one of which is proper to the inflammation, the other to one of its terminations, suppuration.

The symptoms of the first, or the inflammatory period, are, headache, prostration, drowsiness, slowness in the ideas, contraction, muscular rigidity, which may be limited to a few muscles, or extend over almost the whole body, and convulsions, general or partial. These are, so to speak, the normal symptoms of traumatic encephalitis. But they are far from being constant; sometimes, instead of drowsiness, there is extreme agitation, with loquacity, exalted sensibility of the organs of the senses, and insomnia. Sometimes, in place of contraction of the muscles, a paralysis shows itself; and, finally, instead of the febrile reaction, the pulse may have an extreme slowness and an unwonted softness.

The second period is characterized by the symptoms which, whatever be the situation in which it is produced, indicate the formation of pus. Coma and paralysis, indicating generally the formation of an abscess, soon appear; and then all the consequences of the paralysis itself, such as incontinence or retention of urine, and, when they are liquid, the involuntary evacuation of the feces.

These phenomena are generally accomplished in ten, twelve, or fifteen days at furthest. It is not uncommon, however, to see encephalitis develop itself very rapidly, as in one of the cases above reported, and the patients die in twenty-four hours. At other times, after a blow upon the head, symptoms so slight as scarcely to attract attention are experienced, and then at the expiration of perhaps two or three months, symptoms of an abscess are observed, namely, epileptiform convulsions, and paralysis of greater or less extent.

The treatment pursued by M. Nélaton, in the first period of encephalitis, is seen in the cases reported. When symptoms of suppuration show themselves, the patient will certainly die, if, by the aid of the trepan, an issue be not given to the pus; but, unhappily, this operation is rarely followed by success. It must not be forgotten, then, that trepanning is performed here for an affection extremely serious, and although the operation in itself is not a dangerous one, the number of unsuccessful cases is frightful. Another circumstance, the difficulty of ascertaining the precise seat of the abscess, renders this operation very uncertain. In a case of this kind, however, where the seat of the abscess cannot be determined, according to M. Nélaton, a surgeon who hesitates to trepan must not be accused of timidity, nor one who does trepan, be blamed for rashness, even should he fall upon another point than that which is the seat of suppuration.

Compression of the brain, which is an accident quite often observed after injuries of the head, can be assigned to three causes: 1st. Depression of the bone; 2d. Effusion of pus; 3d. Effusion of blood. The first two have been spoken of; and it remains, in order to complete this short sketch of these injuries, to notice briefly the effusions of blood.

The symptoms of compression do not always manifest themselves immediately after the accident; and this has caused a division of effusions into *primitive* and *consecutive*. This division cannot be admitted; the effusion is always primitive, although the appearance of the symptoms may be much more tardy in some cases than in others. Should a large vessel be wounded, and the blood be effused into parts little resisting, and where its presence compresses the most important portions of the brain, at the base of the cranium, for instance, the symptoms of effusion will be manifested immediately; but if a few vessels of small size pour blood slowly on the surface of the brain, the symptoms will appear more tardily; this effusion, however, is not the less primitive.

The quantity of blood can vary from one drachm to six ounces, and even more; it is subject to the nature of the wounded vessel, and to the resistance of the parts in the midst of which the effusion takes place. It can accumulate between the bones of the cranium and the dura mater; secondly, in the cavity of the arachnoid; thirdly, in the vascular tissue forming the pia mater; fourthly, in the substance of the brain or in the ventricular cavities. Those between the cranium and the dura mater are the most frequent; they are generally well circumscribed, and formed of coagulated blood, which is true also of those formed in the substance of the brain. When the effusion takes place in the arachnoid, finding no obstacle, it extends in all directions, and mingles with the arachnoidian serosity. It is the same with the effusion in the pia mater, when the blood is mingled with the cephalo-rachidian liquid.

This effused blood may be absorbed, or it may undergo a decomposition, and excite inflammation around it. It is not so much as a compressing agent that the effusion is dangerous, but as a foreign body capable of undergoing decomposition, and of exciting inflammation in the neighboring parts. According to some surgeons, it can undergo transformation; and certain fibrous and encephaloid tumors, according to them, are owing to the transformation of a clot, which had undergone a peculiar degeneration. This opinion is far from answering the objections that can be made to it.

In the treatment of effusion, there are two indications to fulfil: first, to give issue to the effused blood; secondly, to favor its absorption.

The operation of trepanning appears to be rationally indicated only in those cases where there is fracture of the bone and wound of the integuments, and where the hemiphlegia permits us to consider as very probable the existence of the effusion at the seat of fracture. Except in such cases, it appears to be contra-indicated, for the following reasons:—

1st. The dangers of compression have been much exaggerated;

a traumatic effusion of blood in the interior of the cranium has very little to do with the production of the cerebral symptoms; almost always, in fact, it is accompanied by grave disorders of the substance of the brain or of its membranes.

2d. The trepan is then almost useless; and it always adds the dangers of the operation to those of the primitive lesion. It never offers the surgeon more than a very uncertain chance of effecting his object, for it can very rarely be applied with a knowledge of the cause, on the spot itself where the effusion exists; and, again, the effusion may be multiple.

3d. In many cases, the effusion has been seen to disappear, being absorbed by the forces of the organism, or after the treatment of the accompanying encephalitis.

4th. To the preceding reasons, that drawn from the want of success of the trepan must be added; all the operations for the relief of traumatic effusions, practised in Paris, for more than fifteen years, have, without a single exception, been followed by the death of the patient.

Except, then, under the circumstances mentioned above, the surgeon must limit himself to a treatment purely medical; bloodlettings, leeches behind the ear, purgatives (which, it should be remarked, must be given in very large doses, owing to the diminished sensibility of the intestines); in a word, the treatment proper to inflammation of the brain. In this way, also, the accomplishment of the second indication to be fulfilled—the absorption of the blood—will be favored.

CHAPTER XII.

AFFECTIONS OF THE EYE.

Swelling of the Upper Eyelid.

MARCH, 1852. A young man came into the wards, who, in a quarrel, had received a blow from the fist upon the left eye, and also upon the nose. There was a tumefaction of the upper lid, and, by the touch, crepitation could be detected there. This swelling was due, probably, to a tear in the Schneiderian membrane, caused by the blood, for the patient said that his nose bled afterwards, and that through this orifice the air had been forced into the cellular tissue of the neighboring parts.

This, M. Nélaton said, was an occurrence quite often seen, and that, in a few days, the air would be absorbed; which happened as he had foretold.

Wounds of the Eyelids.

December, 1853. A young man, who, fifteen days before, had been struck by a cane, he said, though it did not look like it; the edges of the orbit had protected the ball, so that only the lids were injured, the eye itself being untouched. The cut in the upper lid was three-fifths of an inch long, and situated in about the centre of the lid, running perpendicularly from the free edge; that in the lower lid was situated nearer to the nose, more towards the median line of the face, just where the lachrymal canal leads from the puncta of the sac. These cuts had been dressed by a surgeon, but reunion did not take place in the one in the upper lid; that in the lower had united, but had left a small notch in the edge of the lid, near the internal angle. Wounds of these lachrymal ducts do not have the inconveniences that might be supposed; they give rise generally to an epiphora, but the epiphora in this case was owing more to the small notch in the lid, than to the solution of continuity of the ducts.

The edges of the wound in the upper lid were pulled apart from each other by the action of the orbicularis muscle; this condition of the eyelid, this harelip, so to speak, called lagophthalmia, is sometimes met with as congenital. This deformity, particularly after having lasted for some time, is rarely simple; the eye, no longer lubricated by the tears, and exposed to the contact of the air, is most usually the seat of serious disorders. In order to remedy the deformity, M. Nélaton waited until the edges of the incision had become covered with granulations, and then bringing them together, he hoped to see them unite. He was, however, disappointed, and was obliged to operate as in harelip; that is, to vivify the edges, and keep them together by small fine needles. In applying these needles, it was a question whether the cartilage was to be avoided, or whether they should be passed through it; it was thought best, however, not to pass through it, for in that case, the needle would only be separated from the eye by the mucous membrane, and its ulceration was to be dreaded, as it would prove a very great obstacle to the union of the sides of the incision.

The result of the operation was what had been hoped; the edges united, leaving the trace of the solution of continuity, which was thought to be inevitable. On the free edge of the lid, at the extremity of the cicatrix, was a slight depression, a very slight notch, which was supposed to be owing to the retraction of the cicatrix; the line of inodular tissue enjoyed its contractility. M. Nélaton was asked if this might not have been avoided by the formation of a *bridge*, as in harelip; by this he could have obtained a projection, which might have answered; but, in the lid, there are skin, muscle, cartilage, and mucous membrane, and it was desired to put the cartilages as much as possible in contact.

This case is interesting, from the operation upon the upper lid, and also from the destruction, by the wound upon the lower, of the lachrymal ducts; most probably, M. Nélaton said, the eye would not be at all incommoded by it.

Adhesion of the Eyelids to each other, and to the Ball.

December, 1853. A man, about forty years of age, who had passed a few days in the wards in the month of June of the same year, returned again to the hospital. Ten years before, some mortar, of sand and lime, had been thrown into his eyes; a violent inflammation followed, and it had been left to get well of itself. On the left side, in the midst of the cicatrices, were two small black spots, occupying a position corresponding to near the centre of the cornea, and by them the patient was able to distinguish light from darkness; the upper lid of this eye was united to the globe by a cicatrix, of one centimetre square in size.

On the right side, the eye was entirely gone; the eyelids there were closed, the edges being united to each other by a cicatrix; this cicatrix extended from the internal angle of the eye very nearly to the external. The upper lid was very much projected, and when an effort was made to raise it up, it was found to be united to the eye itself. In addition to these conditions, called anchyloblepharon, and symblepharon, the globe of the eye was evidently enlarged and deformed; and this arose from the change in the surface of the cornea, which is often seen after burns, and severe traumatic affections; the membrane loses its tone, and is pushed out by the aqueous humor; in this instance the staphyloma was quite great. At the external angle of the eye, for the space of five or six millimetres, or not quite the fourth of an inch, the lid had not united, and, when a probe was introduced, it could be moved a short distance around the hole; here was the only portion of the conjunctival cavity that was not closed, and from it the tears flowed. This is easily understood when the condition of the parts is reflected upon: the lachrymal gland, situated in the depression of the roof of the orbit, and in the upper lid itself, empties itself by ducts, from five to eight in number, which open at the angle of reflection of the conjunctiva from the eyeball upon the lid; one of these ducts, and the largest, opens very near the angle of the eye, and it was supposed that it had escaped obliteration. Formerly, before the situation of these ducts and their orifices was well known, the surgeon would have been much embarrassed to explain the condition of things in this case.

In this case, the great procidentia of the eye was to be remedied, and after that, the conditions necessary for placing an artificial eye were to be created; enough of the eye was to be evacuated, and enough to support the artificial eye was to be left; but the most difficult part was to create a groove, necessary to support the artificial eye; it is easy to make it, but the tendency to close again it is very difficult to overcome. A great number of methods have been advised for this purpose; one is to detach the adherences every day by passing a probe, but this is by no means infallible; M. Nélaton said he had done so for months, and they had united at last. The only way, is to introduce a foreign body, and to leave it there a long time. M. Nélaton had had in the wards a young girl, who wore a circle of platina between the lid and the globe, after they had been separated, for six months; she seemed cured, and, tired of the foreign body, she took it out; in two months she returned to the hospital; the eye and the lid united, as if nothing had been done. M. Nélaton said he did not know if one year or two years would be sufficient to establish the separation, but certainly six months were not. Here, however, as the man intended to wear an artificial eye, this reunion between the lid and the globe was not to be dreaded, and it was unnecessary to dwell upon it.

In operating, the lids were first disunited by introducing one blade of a round-pointed pair of scissors into the opening already existing at the external angle, and dividing the tissue holding them together; the lid was then pulled as far as possible from the eye by means of forceps, and the adhesions dissected. This is a difficult operation to perform, and it was particularly so in this case, for the patient was not quieted by the administration of chloroform; they did not succeed in bringing him properly under its influence. After the lids had been separated, a simple incision was made into the staphyloma; the aqueous humor, the lens, and some vitreous humor, escaped. On the capsule of the lens, which was perfectly uninjured, was a white deposit, whether interstitial or on the surface was a question, but it was thought to be interstitial.

This operation was followed by symptoms of violent inflammation, which commenced to show themselves the following day; ice was applied over the eye, and its application was continued for two weeks. M. Nélaton was absent on account of sickness, and when his substitute, M. Richard, removed the bladder, in which the powdered ice was held, from the eye, the parts had all reunited, and were just as they had been before.

Falling of the Upper Eyelid.

March, 1854. A young man, nineteen years of age, whose upper eyelid fell so as to cover one-half of the cornea, perhaps more. The lid, falling in this way, did not resemble that of the other side; it was, very perceptibly, more voluminous; and this increase of volume was not owing to a tumor contained therein. Though nothing is more common than a chalazium, there was none here; there was no cyst, and there was no œdema, for the depression of the finger did not persist. The eyelid was augmented, both in length and in thickness.

There are several kinds of ptosis; one is congenital, the child is thus born, and judging from the thinness of the lid in such cases, there is every reason for believing that it is owing to an arrest of development of the levator muscle; another is consecutive to a paralysis, generally of the third pair; another is traumatic, and follows wounds, by which the muscular fibres of the levator have been divided; and a fourth is from hypertrophy, which was the cause in the present instance. This patient could raise up the lid; there was no symptom of the paralytic form of ptosis; the contraction of the muscle could be felt, and, moreover, there is generally, in such cases, a paralysis of the other four muscles to which the third pair of nerves is distributed; here they were all intact.

The usual cause of hypertrophic blepharoptosis, is granular inflammation of the lids; and here, the young man himself gave that as the cause of his affection. The upper lid of his other eye had been affected in the same way, and from the same cause, and one year before he had been operated upon, and a portion of the tissue removed; not a trace could be found of this operation.

The same operation was to be repeated on the left eyelid; there was too much tissue, and some of it was to be removed; exactly enough, no more, nor any less, was to be taken away.

While he had an opportunity, M. Nélaton said he desired to mention a very ingenious operation of Dr. Hunt, of Manchester, which had been performed, and with a very good result, in some cases of paralytic ptosis; it is performed with the object of replacing the action of the levator muscle, by that of the occipito-frontal, which contributes to opening the eyelids by raising the skin of the brows. There is, besides, such concord in the action of these two muscles, that it is nearly impossible to raise the brow when the eye is forcibly closed, or to depress the brow when the eye is widely open. Dr. Hunt makes a curved incision, immediately below the brow, extending from opposite one commissure to opposite the other; a second incision joins the two extremities of the first, and the flap of skin thus circumscribed is removed; the edges of the opening are then united by sutures. When the parts have healed, the result is, that the skin of the eyelid is continuous, without folds, with that of the brow; and this, being raised by the action of the occipito-frontal muscle, will necessarily draw the eyelid with it. This operation has been performed, and with most excellent results, and was mentioned on this occasion, as another might not again be offered.

In this case, a portion of the skin of the lid was seized with the forceps, and cut off with scissors; the edges were then held together by a few stitches. In two days the threads were removed, and the boy left cured.

In March, 1852, there was a very curious case of ptosis in the hospital; only twice before, had M. Nélaton seen any similar to it. This patient, who was a female, was able to raise the lid, but it required a great effort to do so; and it was evidently accomplished chiefly by the action of the muscles of the forehead. There was nothing resembling an affection of the third pair of nerves.

Rubefacients, blisters, and the galvanic apparatus of Duchesne, were made use of, but with no benefit. Finally, medical treatment having failed, by the aid of several serrefines, a small cicatrice was formed in the lid, by which the patient's condition was very much improved.

Closing of the Eyelids.

January, 1853. A young man, from the country, twenty-four years of age, who, eight months previously, had suffered a good deal with pain in the head; at that time, his eyelids closed, not from a simple falling of the lid, but from muscular contraction; the occlusion was active. This closing of the eyes was variable as to its intensity; sometimes the patient even succeeded in opening them.

This man had never tried his eyes; he was a shoemaker, from the country, and had never used the globe.[1] He never suffered from derangement of the digestive organs. His eyes presented no alterations; there was no injection of any membrane, nor any pain.

This, M. Nélaton said, was a rare affection. He knew a lady thus affected, who acquired the power of opening her eyes when highly excited by anger. Mackenzie reports a case where the patient could open her eyes by pressing into the small fossette, under the zygomatic process, before the ear. Charles Bell gives another case, where pressure on the cheek, at the angle of the lower jaw, opened the eyes. Why pressure in these situations had this effect, it is difficult to understand, for the nervous filaments supplying the orbicularis muscle do not pass there; tried upon this patient, it had no effect.

A great variety of treatment was tried in this case, but with no success; the patient left in the same condition.

Ectropium.

January, 1854. A young man, about nineteen years of age, who had a double ectropium, the upper eyelid on each side being turned out. He himself attributed his condition to a burn he had received when but a year old; but he was unable to give any particulars concerning it, and M. Nélaton was forced to limit his knowledge of the case to what could be seen at the time of the patient's entrance.

The exact condition of the parts it is very necessary to thoroughly understand. The organ of vision was completely exposed, as much so as when the eye is widely opened; the free edge of the reversed lid was not more than one line distant from the eyebrow. By examination, the tarsal cartilage was seen to be turned outward; but this statement is not sufficient; there was in this case *decomposition*, so to speak, of the eyelid. In the lid, there are (to mention only what is necessary in order to understand the condition) skin, orbicularis muscle, cartilage, and mucous membrane; where the skin is destroyed, and a cicatrix formed, when the orbicularis acts as if to close the eyelids, its curved fibres must act in such a way as to depress the cartilage, and finally to turn it completely inside out. There is, then, not only a turning out of the cartilage, but also an *anatomical decomposition* of the lid. By a little reflection, this is readily understood. The eyes being thus constantly exposed, the conjunctiva was very vascular, the cornea was full of bloodvessels, spread in every direction, and the sclerotic was full also of vessels running parallel to each other. This condition of things, if not interfered with, would most probably terminate in the total loss of the eye. At the time of his entrance, the patient could not see a watch when it was held before him; he could scarcely distinguish day from night. In addition, he suffered pain, and, when exposed to a current of air, a great deal of pain. Besides, it was hideous; the poor boy was frightful; he was an object of repulsion; so that it was hard for him to gain a livelihood. It was necessary to do something, in such a case as this, but it was very embarrassing to decide as to what would be most proper.

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[1] The *globe* is a hollow ball of glass, which they fill with water, and place before the candle, in order to concentrate its light.

The most ancient plan of relieving this condition, is that of Celsus; it consists simply in making an incision into the cicatrix, so as to permit of the return of the lid to its former position. When the ectropium is very slight, this plan may be thought of; but here, where the lid would have to be brought down three-fifths of an inch, it would certainly not be sufficient; in cases like this it invariably fails. There is a method of operating in these cases, known as that of Wharton Jones. This surgeon, after removing the cicatrix, and making regular the wound to be repaired by the flap, made two incisions, which, commencing at the extremities of the lid on each side, were carried upward, so as to meet about an inch from the free edge of the lid; the triangular flap thus intersected, was dissected loose from the summit half way to the base. By traction exerted upon the free edge of the lid, the flap was made to slide downward; and sutures were applied, to reunite the wound where the summit of the flap had been dissected; so that, although the incision had been in the form of an inverted V, the cicatrix had that of an inverted Y. In Mr. Wharton Jones's patient, both eyes were affected; one was cured, but in the other, where the tarsal cartilage was reversed, this operation failed. It was, therefore, rejected in this case.

There is another operation, known under the name of Dieffenbach's operation, but it is only applicable to the lower lid; it commences as that of Mr. Jones, but the flap circumscribed by the V-shaped incision is completely dissected up, and removed by a third incision reuniting the two at the edge of the lid; this bleeding surface is then covered by a flap shaped like a parallelogram, made by extending the upper horizontal incision, and meeting it by another drawn parallel to the external side of the V; the flap thus circumscribed is dissected loose, and being left attached below, is inclined so as to supply the loss of substance.

A third method is that of Fricke, although by Mackenzie it is attributed to another surgeon; a linear incision is made in the cicatrix, and the lid is pulled into its proper situation; by this the linear incision becomes a considerable loss of substance; if the extent of the cicatrix is very great, it is removed by two elliptical incisions. On the anterior portion of the temporal region a flap of sufficient size to fill the loss of substance is then dissected loose, being left attached by its pedicle, and by a twist, by which from vertical it is made horizontal, it is brought to cover the wound. In order to facilitate this movement of torsion, which the pedicle of the flap must necessarily undergo, the internal incision of the flap should descend much lower than the external. The flap brought to this position is maintained in place by several points of suture, uniting its upper edge to the upper lip and the lower edge to the lower lip of the wound in the eyelid. This method has some inconveniences, for a very large flap must be dissected; *in autoplastic operations, every flap that does not appear too large is too small;* moreover, the flap must be made very long, and the pedicle of necessity being narrow and twisted, when it is desired to make a whole lid by this means, it fails, for the flap mortifies.

On several occasions, M. Nélaton has spoken of the fact that after the lapse of a certain time, cicatricial tissue ceases to have its tendency to retract, and he thought that use might be made of it in the present instance. By operating after the method of Celsus, and inflexibly maintaining the separation of the edges of the wound, a cicatrix might at last, that is, at the end of a year, be obtained, that had lost its power of retraction, and the lid would remain in the desired position. M. Maisonneuve, while at Bicêtre, had the idea of uniting the two lids, leaving at the internal angle a free space for the flow of the tears, and thus it was impossible for the cicatrix to retract; he was too much in a hurry, however, to loosen the lids, and only leaving them attached about six months, when they were loose, the ectropium was gradually reproduced; had he waited until the tissue had lost its retractility, he would have succeeded very well. This operation, M. Nélaton said, he would adopt in this case; he did not know how long he would have to keep the eyelids closed; but, at all events, the eye would then be in a better condition than if left as it was.

The following operation was proposed by a student: After the cicatrix had been divided, and the eyelid brought to its proper position, a bridge-flap, that is, a flap left attached at each extremity, would be dissected loose above, and pulled down so as to supply the loss of substance, and fastened there by sutures. The giving way of the sutures, and the impossibility of keeping the flap in position by agglutinative bandages, from its narrowness and the flowing of the tears, prevented the adoption of this proceeding.

With the object, therefore, of remedying the pain the patient suffered from the exposure of his eye, and of arresting the change going on in the cornea, and which would otherwise end in its perforation, and with the hope, also, of obtaining a cicatrix in the eyelid, which would have lost its retractility, the edges of the lids of the left eye, which was the worst, were vivified, and fastened together by sutures. Ice was kept applied to the part for one week, at the expiration of which time it was removed; the lids were united, and upon the suppurating surface on the upper lid a simple cerate dressing was applied. In this condition the boy left the hospital.

Three months afterward, in the month of April, the boy returned with typhoid fever; from this and from exposure, a gangrene of the cornea of the right eye had taken place, a great deal of it had gone, and the deep-seated layer which was left was very irregular. M. Nélaton was very well satisfied with the part he had taken in this case, for if this had happened to the better eye, what would have become of the other. The boy died about two weeks after his entrance, from the typhoid fever, and the covered eye was found to be intact.

Entropium.

May, 1854. A man, forty-seven years of age, entered the wards with a quadruple entropium. Four years before, he had had an affection of the eyes, which must have been very obstinate, for he remained nine months in the wards of M. Laugier, at the hospital of La Pitié; when he went out, his condition was somewhat improved, but the symptoms returned soon again, and, at the time of his entrance into M. Nélaton's wards, he was no longer able to work.

The two eyes were so much alike that the same description suffices for both. The eyes were shut, and the lids contracted, so that they were rolled inwards on themselves; when they were unrolled, the lashes were seen in contact with the eye; continuing to unroll, the lower lid was found to be attached to the cornea; the cul-de-sac of the conjunctiva between the lid and the cornea, in place of its normal depth of two-fifths of an inch, had barely two lines; the parts were of a gray tint from the oxide of silver, owing to the repeated cauterizations. In great darkness the patient said he could open his eyes a little, but throughout the day they were thus firmly closed. The affection had lasted a long time, and it prevented the patient from working; it was necessary to do something for his relief.

There are many ways of treating entropium; in some simple cases, it often suffices to keep the edge of the lid directed outward by means of a small agglutinative band of diachylon, or collodium, or of court-plaster. By this the irritation of the eye by the lashes is prevented, for in these cases there is what is called a *vicious circle:* the irritation of the eye causes the contraction of the lids, and this contraction of the lids causes again still greater irritation of the eye. Such means as this, however, would not be sufficient in so severe a case as the present. Nor would the pulling out of the lashes, for some would escape, and, moreover, they would inevitably be reproduced; when but a few hairs are deviated, this may answer, but here it never would. In some cases, cauterization of the edge of the lid has been resorted to, in order to destroy the bulbs of the hairs.

Another mode of treatment that very often succeeds, is to excise a portion of the lid, and then to unite the edges of the wound; this, however, is only sufficient when the entropium is not very great. It is well, also, to know that a vertical incision has been made in the lid, in order that it might be brought to its place by the retraction of the cicatrix; the method is an ingenious one, but it does not answer.

In an obstinate case of entropium, Crampton had recourse to the following operation, which has since been successfully practised by other surgeons. Near each commissure a vertical incision, three-quarters of an inch in length, is made, taking care at the internal commissure to avoid the lachrymal duct; the lid thus free, only holding by its base, is maintained at a distance from the eye, by means of threads, passed into the cartilage, and then fastened to the forehead, if the lower lid has been operated upon, and to the cheek, if the upper. The lid thus detached, is held for eight or ten days at some distance from the eye, in order that reunion can take place only by granulations. M. Nélaton has never seen this operation practised, but it is said to give very good results, which he believed to be true, for upon this patient it was easy to see how the action of the orbicularis turns the lid inward.

Some physicians have supposed that the affection was caused by the action of the orbicularis, and that to cure it, all that was requisite was to divide its fibres. By examination, it was seen that in this man the opening of the eye had lost one-fourth or one-third of its extent; and this is caused by the contraction of the curved fibres of the orbicularis; the edges of the lids at the external angle of the eye ulcerate, and form adhesions.

In an old woman, at Salpétrière, M. Nélaton has seen three-fourths of the opening to be thus closed, leaving a very perceptible line of cicatrix. In consideration of these things, some surgeons have thought that it was sufficient to cut the orbicularis muscle, and M. Nélaton has done it himself, but without success; it is, however, a rational operation.

In this case, M. Nélaton said he would do something similar to this section of the muscular fibres; he would endeavor to paralyze the orbicularis, by the section of those branches of the facial nerve by which it is supplied; the operation, at all events, would not be a dangerous one.

This operation had not been performed when I left Paris.

Tumor of the Eyelid.

December, 1852. For the removal of the small tumors (situated in the eyelids, known as chalazæ), M. Nélaton recommends the use of the *pince-anneau* of M. Desmarres.

These tumors are situated generally between the orbicular muscle and the cartilage; sometimes they produce atrophy of the cartilage, so that only the mucous membrane separates it from the eye; they are very adherent, and their excision is quite a delicate operation.

This instrument of M. Desmarres has the double advantage of fixing the lid, and of preventing the flow of blood, which interferes with the operation.

In order to use it, the posterior blade is placed under the lid, and then, by means of the screw, a compression is exercised around the tumor, sufficient to prevent the blood from getting to the parts to be divided.

Cancroid of the Eyelid.

June, 1852. An old man, quite robust in his appearance, who had an affection of the eyelids of the right eye. Ten years before, he perceived a small pimple, situated on the lower lid, near the external angle; when asked, he always said that no scabs had ever formed upon its surface. After this pimple had existed for nine years, he became sick, and went to a hospital; there this pimple was cauterized, but with what caustic the patient did not know. Four months after leaving the hospital, the part was again cauterized, and this time with Vienna paste.

When he came into the wards, about six months after the application of the Vienna caustic, the disease was no longer limited to the lower lid; the whole of the free edge of both lids was affected, and the opening between them, from the effects of the disease and of the cauterization, had an extent of but two-fifths of an inch. This, moreover, was not the whole of the disease. If the conjunctiva covering the ball is affected, together with that covering the lids, the whole forms but one mass, and the eye must lose its mobility; in this case, the eye still preserved some little; when a probe was introduced behind the lids, it could be moved about at the internal angle of the eye, but not at the external; there the lids were adherent to the ball. The ball itself of the eye seemed harder than usual, and it had completely lost the power of vision; the patient could not distinguish with it day from night. Moreover, he complained of pain in the eye, in the forehead, and in the temple; and he was likely to have still greater suffering, for he was threatened with keratitis, ulceration of the cornea, hernia of the iris, &c. &c.

An operation was to be performed in this case, with the object of removing all the diseased tissues. It would be impossible to say beforehand all that would be required, but the whole of the disease at the external portion would first be removed, and the eye, being thus exposed, would be left if found to be healthy, and if otherwise it would be removed.

After making the external incisions, it was found to be necessary to remove the whole eye, in order to take away all the disease. The patient recovered from the operation without any difficulty.

In December, six months afterward, this patient, aware of the danger of the affection, returned to the wards on account of the formation of scabs at the external angle of his left eye. These scabs formed upon two small projections, which were situated there, upon the lower lid. The caruncula, which was enlarged, was supposed by some to be affected with the disease, but M. Nélaton thought its condition was owing to its being so much exposed by the retraction of the lid from the ulceration at the external angle. The diseased portion of the lid was excised, and the man soon left, and did not return again.

June, 1853. An old man, who had a cancroid affection situated upon the edge of the lower eyelid of the left side. The disease commenced about one line from the internal angle of the eye, and extended over about one-third of the lid; it was the third of an inch in breadth, being propagated upon the skin and upon the conjunctiva; it was, so to speak, *astride* of the edge of the lid. There was a successive formation of scabs upon a bleeding surface, and the other phenomena of cancroid affections; as yet, there was no glanglionary engorgement.

In order to remove this disease, it would be necessary to make the incision just where the tears flow, and the question was whether, in order to prevent epiphora, an anaplastic operation should not at once be performed. If it were necessary to repair the loss of substance, the disease would be removed by a V-shaped incision, and then, upon the external angle of the eye, a horizontal incision would be made, to be met by another made parallel to the external branch of the V; this flap would then be dissected up, and being left attached at its base, would be moved laterally so as to be united to the internal branch of the V. This operation, however, is not without danger, for the parts are liable to be attacked with erysipelas, and it was proper to try first if a more simple operation would not answer. M. Nélaton said he remembered an operation performed by M. Gerdy, in which both eyelids were removed, and which was not followed by epiphora. Again, experience has shown that when upon the lip, a portion, similar to that to be removed in this case, is excised, although the loss of substance appears irreparable, it is nevertheless almost entirely filled up. It would be better, therefore, to remove this disease by a curved incision, and afterwards, if an epiphora resulted, the blepharoplastic operation above mentioned could be performed.

The curved scissors were used to remove the diseased tissue, and when the parts had healed, the man left without it being thought necessary to do anything more for him.

Tumor of the Conjunctiva.

January, 1852. A man, who for eight months had had something the matter with his eye. The sensation he experienced was similar to that occasioned by the presence of a foreign body.

On examination, at the lower internal edge of the cornea, a small egg-shaped tumor was found, to which a pedicle was attached. The cornea was covered by this tumor, but it was attached by its pedicle to the conjunctiva alone, as could be detected by the movements which could be given to it. The surface of the tumor was white, granular, with fine furrows, and there was an exudation of a cheesy matter from it.

This affection, M. Nélaton said, was a vegetation of the conjunctiva, an affection very rarely met with, and only in Mackenzie[1] had he been able to find a notice of it.

When he first saw it, he thought it to be a cyst containing a cysticercus, a very interesting variety of cysts of the conjunctiva, of which a number of cases have been reported by Sichel and others.

The cyst containing a cysticercus is round, sometimes elliptic, and the size of a small pea. Its appearance varies according to the thickness of the conjunctiva, and that of the cyst itself; the tumor is generally of a pale rose color, and half transparent in the centre, where a circumscribed whitish point can be distinguished.[2] All the treatment of the tumor in this case, consisted simply in its excision.

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[1] The work of Mackenzie on Diseases of the Eye, is one M. Nélaton frequently said could not be too much consulted. The American edition now in press, edited by Addinell Hewson, M. D., will be most valuable.

[2] The *cysticercus* is a kind of entozoon, which has an almost cylindrical body, and whose head, provided with four suckers, is crowned by two rows of sixteen elongated hooks, and terminated by an obtuse head, cylindroid and imperforate. These cysticerci are almost always contained in membranous cysts.

The cysticerci are composed of a first vesicle, ovoid, which fills the cyst of cellular tissue called the adventitious cyst, furnished by the animal attacked. This vesicle is filled with liquid; it presents an orifice, surrounded by small circular folds, to the circumference of which is inserted, at its internal face, a second small vesicle, which dips in the liquid. The animal, properly speaking, is attached to the bottom of this last vesicle, in continuity of tissue with it, by a wrinkled pedicle. When it is retracted on itself, it fills exactly the pocket, and its head is just within the orifice mentioned above in the large vesicle, which is common to it and to the small. Thus, when it desires to suck blood, all it has to do, is to push out the head from this orifice. The cyst of cellular tissue surrounding all, often presents a small white cicatrix, surrounded with bloodvessels, which corresponds with the opening from whence the animal pushes his head.

Their usual seat is in the muscular tissue, and in the cephalo-rachidian nervous centre.

Pterygium.

May, 1852. A young man with a tumefaction, accompanied with vascularity of the mucous membrane of the eye, and of the subjacent cellular tissue; the form of the tumefaction was peculiar; it was in the form of a triangle, the base being placed at the external edge of the caruncula, and the angle extending for some distance upon the cornea. The case was a pterygium, and in this instance the angle was terminated by a small rounded projection, in place of a point formed of a fine and excessively transparent membrane, as it almost always is.

Many kinds of pterygium have been distinguished, but M. Nélaton prefers dividing them into but two, the adherent and the non-adherent. In this case, it was non-adherent, that is to say, it was attached to the cornea, but all that portion covering the sclerotic was movable.

In operating for the removal of a pterygium, the first thing to do is to fix the eye, for which purpose the instrument used in the operation of cataract can be employed; or, where the membrane is sufficiently resisting to permit of it, as in the present instance, a pair of forceps *à griffes*. A fold of the pterygium being seized with the forceps, it is dissected loose from the ball of the eye, and then it can be excised, or, a hole may be cut in the fold and the membrane drawn through it; the latter is the method pursued by Desmarres, but M. Nélaton said that, although he had *immense* confidence in his opinion, he preferred, himself, to excise.

This operation was performed, and the patient left in a few days cured.

Inflammation of the Cornea.

December, 1851. A young man with a common affection of the right eye; one month before, it became painful and red; for three weeks, he did nothing; for a week, he had been using a collyrium of lead-water, and the affection still continuing, he decided, at last, to enter a hospital.

On examining the two eyes, a striking difference in their color was to be seen; in the left eye, the iris was blue slightly bordering on the gray; in the right the iris was greenish, its color was uniform; the small spots, sometimes seen in inflammation of the iris, were wanting in this instance. In the conjunctiva there was a network of vessels, crossing each other in every direction, but it was not very well marked; at the circumference of the cornea, was a radiated circle of bloodvessels of a carmine tint. The cornea itself, in its lower, external part, appeared cloudy, and in the centre of this portion, was a grayish-yellow spot, as large as the head of a small pin, and very deeply seated, very near, even, to the posterior border of the cornea. More deeply still, behind the cornea, the aqueous humor did not appear as limpid as it usually does, and the iris was very slightly pushed backwards, and immovable.

This purulent spot in the cornea would either be absorbed, or ulcerate its way out; if its absorption took place, the cloud which formed a kind of areola around it would remain for a long time; if it did not, it would go further and further back, until it would fall into the anterior chamber, and there also it could be absorbed.

In order to promote the absorption of pus, calomel was given in small doses, frequently repeated, one grain with one-fourth of a grain of opium every two hours, until its influence was manifested by the condition of the mouth. The laudanum of Sydenham (which corresponds very nearly to the vinum opii of the *U. S. Pharmacopœia* was used as a collyrium. For fear of the formation of adhesions by the iris, belladonna was used. An inflamed iris is made to dilate with difficulty, but by applying the belladonna five or six times a day, it can be accomplished.

This patient's condition was very much improved, but he did not remain long enough in the wards for the accomplishment of his cure.

January, 1852. A charbonnier, who had an affection of both eyes; the only cause he knew for it was the one always given—he had caught a cold in them, eighteen months before.

In the left eye, the cornea was transparent in the middle, but when properly presented to the light, small dots could be seen on its surface—what are called *ulcères à facettes;* the rest of it had been very much changed, being covered by a very rich network of vessels. This injection was in the subconjunctival tissue; very little of it was in the cornea. The anterior chamber was not deformed; the iris had its normal color; and the pupil was small, but without any false membranes. The eyelid was red and injected, and in the *cul-de-sac* of the conjunctiva were some granulations. In the left eye, then, were superficial keratitis, ulcerations, and granulations of the lids.

In the right eye, precisely in the centre of the cornea, was a small dot; the iris was resting against its posterior face; there had been perforation of the cornea, and the emptying of the anterior chamber. It is proper to remark the absence of hernia of the iris; owing to the situation of the perforation, exactly in the centre of the cornea, the opening of the pupil fell there when the aqueous humor was evacuated; this was better for the iris, but, on the other hand, there was danger that the capsule of the crystalline would become opaque, and a capsular cataract, difficult to cure, result.

In these cases, the surgeon must be careful, and as soon as possible, he should cause the reproduction of the anterior chamber. By closing the eyelids, and fixing them firmly in that position, the aqueous humor does not find an easy issue, and accumulates in its chamber. As regards the opening in the cornea, sometimes they are repaired by a veritable reproduction of corneal tissue; the cicatrix is either sufficiently strong, or too thin; and in the latter case, there is keratocele; sometimes, again, by sustaining this small tumor, by the eyelid, the cicatricial tissue becomes strong enough to support the pressure behind without yielding.

By keeping the eyelids firmly together, at the expiration of nine days, the opening in the cornea was closed, the anterior chamber was filled, and the iris was in its normal position.

Upon the right eye, a complete circle of conjunctiva, about one line wide, was excised all around the cornea. Very little pain attended the operation, and afterwards cold water was applied. This operation is followed by a muco-purulent discharge lasting for one or two days; in ten days, the formation of a new tissue is accomplished.

March, 1853. A young man who, three months before, had had an attack of gonorrhœal ophthalmia, which had left a very peculiar alteration in the cornea. Generally, in these cases, when the inflammation extends to that membrane, it becomes cloudy, more or less opaque, and a slough takes place, so that the anterior chamber is opened. In this case, things had not occurred in this way; only about one-half of the thickness of the cornea, in a small spot situated directly in the centre, had been eliminated, and when he entered the wards there was a keratocele from the hernia of the deep-seated lamina of the cornea. The cornea had lost a layer of tissue, by which its consistence had been diminished, and the deeper layers, incapable of supporting the pressure behind, were pushed outward. Sometimes these keratoceles are very small and pedunculated.

The prognostic in such a case is not so unfavorable as one might be inclined to believe. There is reproduction of the corneal tissue, certainly to the extent of two millimetres, a hole made into the cornea disappears, and a transparent membrane supplies its place. In this case, the condition of things was still more favorable, for the loss of tissue did not extend completely through the cornea. M. Nélaton said that he had seen a case like the present, where the keratocele had existed more than a year, and the eye preserved.

In order to protect the cornea as much as possible, small bands of court-plaster were applied, so as to keep the eyelids firmly closed. This patient was unwilling to await his cure in the hospital.

Staphyloma.

January, 1852. A young man, who said that, six years before, he had taken cold in his eye, that is to say, had had an ophthalmia. The day after he was attacked, there was a profuse purulent discharge, and the physician who was called treated him very energetically; leeches were applied to the temples, very caustic collyria were made use of, and afterward blisters were applied to the back of the neck. At the time of this occurrence he had no gonorrhœa, nor had any one in the house, so far as he could judge.

When he came to the hospital, there was a tumor in the left eye, corresponding to the cornea, nearly spherical, but rough, and with small black spots upon it; it was, however, still quite firm; the sclerotic all around it seemed to be depressed. There was a slightly painful sensation in the eye, and being a deformity, and of no use as an organ of vision, the boy demanded simply to have it *pulled out.*

It is a question, whether a staphyloma of the cornea, after being long irritated, may not degenerate into cancer. M. Nélaton is, however, very little inclined to believe in the transformation of tissues, and thinks the cases which have been reported, to have been cancers from the commencement.

In the choice of an operation for the removal of the projection, some surgeons prefer to pass a double ligature through the tumor, and to tie it on each side; it is, however, a dangerous proceeding. The usual operation is this: A cataract-knife is passed through the lower portion of the cornea, as in the operation for extraction, and then, seizing the flap with a pair of forceps, the excision of the tumor is completed by the scissors. This excision is, however, almost always useless, and a better method is, after the example of Küchler, to make a simple transverse incision, by passing the cataract-knife quietly through. The surgeon need not worry himself about the crystalline lens, whether it comes out or not; and it was very easy, when this simple incision is made, to keep the vitreous humor from coming out. In order to be able to insert an artificial eye, the stump should be left as large as possible, and the mucous membrane must be preserved, for it is necessary to have the *cul-de-sac* of the conjunctiva, into which the eye must be set. If the mucous membrane is cut away, the upper part of the superior tarsal cartilage, and the lower part of the inferior, are drawn together by the cicatrization, so that these cartilages are reversed, and the application of an artificial eye is impossible.

A transverse incision was made into the tumor, dividing it from its base to its summit, after which the eyelids were kept together by means of strips of court-plaster; and compresses, dipped in cold water, were kept constantly applied for forty-eight hours. When the eye was examined, it was found to have its normal volume, or rather less than that; from the elasticity of the tissue of the cornea, when divided, the retraction of the two portions had been quite considerable; the incision, at the expiration of the two days, had completely healed. At the end of ten days, an artificial eye was inserted; it was not a perfect one, for it is best that the patient should learn how to wear them, before having the one they are to wear permanently, constructed for them.

February, 1853. A child, ten years of age, with a staphyloma of the left eye; he was pale and emaciated, and such children are often seen attacked with severe diseases of the eyes. He himself attributed his affection to a scratch of the finger-nail, received from his brother; but, as has often been observed, M. Nélaton did not believe it to be owing to an external injury.

The base of the tumor was the circumference of the cornea; its projection was two-fifths of an inch; its summit was of a dull white color, the color of macerated fibrous tissue. In the sclerotic membrane, and in the sub-conjunctival tissue, there was a great deal of vascular congestion.

This tumor, projecting out between the lids, was a shocking deformity; and moreover, the cornea would ulcerate, and a fistula communicating with the interior of the ball of the eye, would result; the suffering of the patient from this would be fearful.

It was necessary, under such circumstances, to operate, to remove the tumor, and to leave enough of the ball to adjust an artificial eye. The best method is that of Küchler, a simple transverse incision, but in cases where the projection is very great, the cornea frequently immediately cicatrizes, and the tumor is reproduced. In this case, therefore, the old method of excision would be combined with that of Küchler, and after making the transverse incision, the edges of the wound would be seized with forceps, and an elliptical portion cut away. As the operation is very painful, chloroform should be given.

Two days after this operation, it was necessary to examine the eye closely, to find where the incision had been made; it had no more than its normal dimensions.

January, 1853. A girl from the country, eighteen years of age, and of a very healthy appearance, with a transparent staphyloma in both eyes. The affection had first been noticed when five years of age, at which time she commenced to work in the fields; and this, she thought, was the cause of the disease of the eyes, but it only meant that it had made its appearance at that time. There was no sign of any wound, nor of any cachectic diathesis of the system.

The left eye was much more affected than the right; the cornea, which was perfectly transparent, there not being a spot upon it, was not only very projecting, but it was augmented in size; its dimensions were greater than was natural. The anterior chamber was at least three times as large as it should have been, and, at the same time, it was perfectly transparent. The iris was pushed backward, so that its pupillary margin was much more deeply seated than its attached portion. The sclerotic had, *perhaps*, a slightly bluish hue. Vision was lost; the patient could distinguish night from day; but could not perceive objects, even the largest. There was no painful sensation in the eye, no burning, no feeling of distension, and the movements of the globe were perfect.

Hydrophthalmia can affect different portions of the eye. The liquid can be accumulated in the anterior and posterior chambers, and in the present instance it was there. Sometimes it is between the choroid and the sclerotic, and at others between the choroid and the retina. In this case it was easy to see that the affection was limited to the anterior portion of the ball of the eye.

It is not very easy to diagnosticate the dropsies of the posterior portions of the eye; and it is very important to know how to recognize them. Suppose an exhalation to take place, from the whole circumference of the choroid coat; this membrane, from the optic nerve to the crystalline lens, will approach the central axis of the eye, just as an umbrella that is being closed. When the eye is looked into, something white is seen, so that a cataract could be thought to exist, when it is nothing but the retina. The operation for cataract has been performed in these cases; and, what is far more serious, the eye has been extirpated, from the idea that it was cancer.[1] There is a projection of the retina, just as in cancer of the eye, and it requires great skill to distinguish the foldings of the retina, from the lumps of cancer; moreover, in both, the pains are excessive.

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[1] On one occasion, M. Nélaton himself extirpated an eye, that he supposed to be affected with cancer, and presented it to M. Sichel; this skilful practitioner also thought it was a cancer, until, having carefully dissected the parts, he recognized the case to be one of sub-choroid dropsy.—*Nélaton's Elémens de Pathologie Chirurgicale*, vol. iii. p. 220.

In the treatment of this affection, Beer made a puncture of the cornea, and opened the wound for several days afterwards by introducing a probe; he said that, by this means, a change could be produced in the membrane of the aqueous humor, just as there is in the tunica vaginalis of the testicle.

A simple puncture was the only treatment adopted in this case; and it was not attended with any permanent benefit; the girl left the hospital in the same state in which she had entered.

Iritis.

February, 1852. A woman, thirty years of age, with signs of constitutional syphilis; she had osteocopic pains in the bones of the cranium, and a papular eruption upon the skin. This patient complained, also, of a cloudiness in the vision of the right eye. In the right eye, the conjunctiva was injected, and in the sclerotic was a radiated circle of vessels stopping at the circumference of the cornea; the cornea itself was healthy. The color of the iris, as compared with that of the opposite side, had changed, and the pupil was immovable, and deformed by a sort of notch situated at the very uppermost portion. Beer has pretended that, in syphilitic iritis, there was something peculiar in the deformity; that the pupil was displaced upward and outward; but this is not true—it varies in different cases. Too much importance has also been attached to a coppery hue of the iris; it is far from being constant; and, besides, it is found, also, in simple iritis. It is very probably only owing to the combination of the primitive color of the iris with the new color furnished by the congestion of the bloodvessels. The symptom does not possess the peculiar signification that has been given to it by Sichel and others. Upon the pupillary border of the iris was a small, conical projection, of a grayish yellow color, whiter at the summit than at the base. This little tumor also projected equally posteriorly, for precisely at that point there was synechia posterior, the iris adhering to the anterior capsule of the crystalline. These small tumors developed in the iris, called by Beer condylomata, are most generally situated upon this portion of the iris. The generic denomination of condyloma has been improperly given to these tumors, for they do not always present the same characters as would seem to be thus indicated; as M. Ricord has explained, the eruption upon the iris is analogous to that which is existing upon the skin.

These tumors exist sometimes without inflammation; sometimes they are accompanied by an inflammation; and sometimes a sort of syphilitic iritis exists without tumors, without any eruption—just as upon the skin the different exanthemata are met with. In this case there were tumors, accompanied by slight inflammation.

M. Ricord considers this form of syphilitic iritis to be in the period of transition between secondary and tertiary symptoms, and, in its treatment, the remedies appropriate to these different stages of syphilis may be combined.

The treatment, in this case, consisted in the administration, every evening, of a pill containing one grain of the iodide of mercury; the patient commenced to be benefited almost immediately, and then left, with the design of pursuing the treatment at home.

Artificial Pupil.

January, 1852. A woman who had undergone two operations in the wards, for cataract. There was some entropium of the lids, and after the first operation, which was by extraction, a violent ophthalmia took place and the eye was entirely lost; in the second eye couching was performed; here the inflammation had been more deeply seated, and had resulted in occlusion of the pupil, together with opacity of the internal portion of the cornea; but, in this eye, the patient preserved the power of distinguishing light from darkness. Four months had then elapsed since this second operation had been performed.

A variety of methods have been devised for the purpose of remedying this deformity of the pupil. The first operation, the one practised by Cheselden, consisted in making a simple horizontal incision into the iris, by means of a small one-edged knife introduced into the eye, at a short distance from the cornea, as in the operation of couching. This operation has been modified in many ways: by introducing the knife through the cornea instead of through the sclerotic, and by changing the form of the incision, making it curved, triangular, and crucial. All these methods of incision, however, though successful in a few exceptional cases, very often fail, and they have very properly been generally abandoned. The object of the incision, is to divide transversely the contractile fibres of the iris, generally considered to be of muscular nature, in order to obtain, by their subsequent retraction, a sufficient separation of the edges of the wound to admit of the passage of the rays of light. But, in the greater number of cases in which the establishment of an artificial pupil is demanded, the iris has been the seat of an inflammation by which its texture and the properties of the elements entering into its composition have been profoundly modified, and the newly-formed pupil soon disappears by the reunion of the edges of the wound, which have undergone no separation.

Scarpa had the idea of loosening, for a certain extent, the iris from its ciliary ligaments; and this operation has also undergone many modifications. The pupil formed in this way tends, however, to disappear as in the other operation just mentioned; and, moreover, it is very often followed by violent neuralgic pains. When this method of operating is indicated by the condition of the eye, as, for instance, when there is extensive opacity of the cornea, and a transparent zone still exists at the circumference, a portion of the loosened iris should be excised, or pulled out and left between the edges of the wound in the cornea, in order to prevent the obliteration of the new pupil.

The best method of forming an artificial pupil is to excise a small portion of the iris, being guided, as to the portion to be removed, by the situation of the opacity in the cornea. An incision is made into the cornea, and a portion of the iris being drawn out, it is excised with scissors. In this case, from the situation of the opacity in the cornea, the new pupil would be made in the external part of the iris.

There is also a method of displacement of the pupil, in cases where the opacity of the cornea is immediately in front of the normal opening. An incision is made into the cornea, and, by means of small forceps, the iris is seized, and having been drawn to a proper position, a portion is left in the opening in the cornea, in order to maintain it there.

M. Nélaton experienced some difficulties in the performance of this operation, for the anterior chamber of the eye was almost obliterated, and he was forced to proceed very slowly and cautiously. The surgeon must be very careful, in making the section of the cornea, not to touch the iris, for the hemorrhage which results obscures the rest of the operation. When a brilliant instrument is introduced into the cornea, nothing brilliant is seen until the membrane has been traversed, when the shining point is again seen; it is thus that the surgeon is directed. After the section of the cornea, a small pair of forceps was introduced as far as the centre of the eye, then directed backward, and the iris was seized and drawn toward the orifice. Instead of yielding to the traction, the membrane gave way, and one of the flaps being pulled out, an assistant excised it. The eyelids were then closed and kept in that position by strips of court-plaster; and compresses of cold water were applied over the part. Forty-eight hours afterward, there were no traces in the cornea of the incision which had been made; the blood effused in the anterior chamber had been almost entirely absorbed, and there was a large opening in the iris, through which the patient could see very well. No bad symptoms followed, and she left with a very useful eye.

Wounds of the Eye.

July, 1853. A case of wound of the eye, that was particularly interesting, on account of the researches M. Nélaton was, at the time, engaged in making on the operation for cataract by laceration of the anterior capsule. The patient was a mechanic, who was struck by a small fragment of iron in the eye; the piece, nearly half an inch in length, was implanted in the globe; he pulled it out immediately, and he continued to work for the rest of the day, but becoming worse and worse, on the fifth day after the accident he came to the hospital.

There was superficial and deep-seated injection of the eye, and upon the cornea were seen at once traces of the recent wound; it was in the lower, external portion, commencing half a line from the edge, and extending upward one and a half. Looking more deeply into the eye, the anterior chamber was seen to have almost disappeared; the pupil was nearly filled by a flocculent mass, surrounded by a uniform opacity; this flocculent mass resembled wet cotton padding.

In regard to the injury received in this case, the wound of the cornea was incontestable; that much was settled; the flocculent mass was a portion of the crystalline lens, the anterior capsule had been torn, and the lens, swollen from imbibing the aqueous humor, was protruding, forming the kind of mushroom seen in the anterior chamber.

As to what would happen in this case, it was infinitely probable that the protruded portion of the lens would be absorbed, and that the absorption would not be arrested there, but would continue until the whole lens would have disappeared. The great question was, whether there would be a capsular cataract remaining. Scarpa was very much afraid of these secondary cataracts after depression, and he was very particular to take away the anterior capsule; but M. Laugier, in his operations by suction, drew out all the liquid part, and obtained cures without any secondary cataract, the capsule remaining transparent. In the man operated upon, about a year before, by means of puncturing the anterior capsule through the cornea, no secondary cataract had been formed.

It would be necessary, in this case, to guard against contraction and adhesions of the iris, and for this purpose, belladonna would be dropped into the eye; for the inflammation, M. Nélaton said, he knew of nothing comparable to small doses of calomel and opium. Under this treatment, the inflammatory symptoms disappeared, after which the patient left the wards, to await, at home, the gradual absorption of the crystalline lens.

July, 1853. A little girl, with a wound of the eye, caused by the explosion of a percussion cap. It is a very common accident, and generally the piece of metal is driven with a degree of violence one would not be inclined to believe; in some cases, it passes entirely through the crystalline lens; and in this, the anterior capsule had been lacerated.

The patient was not brought to the hospital until forty-eight hours after the receipt of the injury; the wound was situated in the lowest part of the cornea, one-half being upon that membrane, and one-half upon the sclerotic; it was a vertical cut, about two lines long. There was a slight hernia of the iris; and the crystalline was already opaque, and protruding through the opening in the capsule.

Authors say that, in these cases, the crystalline, after being opaque, recovers its transparency; but this, M. Nélaton said, he did not believe: the pupil containing the opaque body becomes clear again, but this is to be explained by the disappearance of the lens. Instillations of belladonna were made at once, with a slight hope of obtaining, by its action upon the iris, the retraction of the portion adhering to the wound of the cornea; but this was prevented by the adhesions that had already formed. The child left the hospital after remaining but a few days.

January, 1854. A young man, from the country, who, while out shooting, was struck by a shot in the eye, fired forty or fifty paces from him; the shot was of the size number five or six. He was taken home, cold compresses were placed over the eye, and leeches were applied around; the next day, he was brought to the hospital. Towards the external and lower side of the cornea, very near to the edge, was a wound, in size corresponding to the number of the shot, that seemed to be formed of four radii, at right angles to each other; there was a slight anterior projection at that point; it looked just as if the cornea had burst open there. The cornea was still everywhere transparent, and the condition of the parts behind could easily be examined. The anterior chamber contained a liquid tinged with blood; at the internal and upper part of the iris was a small, round, black spot, slightly concealed, of course, by the blood, and at the external and lower part was another of the same color, but shaped somewhat like an ellipse. The sclerotic membrane, and the sub-conjunctival tissue, were injected.

With this injured eye, the patient was able to distinguish night from day, but was unable to distinguish objects. He suffered some pain in it, but not much; he had come to Paris in a cabriolet, and then by railroad; that part of the journey accomplished in the cabriolet, had been very painful to him—he suffered greatly in the eye at every jolt.

A shot of lead, fired at fifty paces, if there had been no ricochet which would make it lose some of its force, would have penetrated into the interior of the eye. This shot had passed through the cornea very near to its edge, and had produced a separation of the great circumference of the iris from its attachment; the large black spot, seen just behind the wound, was an artificial pupil, made there by the passage of the shot. The other black spot, seen toward the directly opposite part of the iris, was the natural pupil, much contracted, which had been drawn to this position in consequence of this loosening of the iris.

In regard to the prognosis in this case, nothing is so variable as are the consequences of these wounds. In some cases, where the surface of the eye has been only bruised, the sight is lost; in those cases where the shot has entered, it almost infallibly is; and, sometimes, there is at once an immediate abolition of vision. In some cases, the shot has stopped in the anterior chamber, whence it can be extracted, and the sight is then sometimes preserved. In cases like the present, where the shot penetrates deeply, and remains, there are sometimes signs of iritis, choroiditis, &c., lasting about twelve months, while other patients preserve the eye in appearance healthy, but with terrible neuralgic pains, lasting indefinitely. M. Nélaton has seen the globe of the eye extirpated on account of these pains, and the shot was found placed just at the root of the expansion of the optic nerve. He related an interesting case, in some respects, also, an amusing one, that he had seen just twelve months before. A farmer, for the purpose of protecting himself against robbers, constructed an ingenious trap, in which a loaded gun was discharged when a certain wire was touched; it happened, however, soon after its completion, that he came in contact with the wire himself, and the gun went off but fifteen paces from him. Only one shot, number five, of lead, struck him, and as he was placed sideways towards the gun, it passed through one eye, through the ethmoid bone, and lodged in the other eye. In this case, the eye which had been traversed by the shot had recovered its sight, and the other, in which it remained, was blind. And this is what results as a general rule; if the shot remains, the eye is lost; if it comes out, it gets well. When it cannot be seen, it is always useless to search for the shot; there is no rule by which the surgeon can be guided; there is no *course* (*trajet*), as elsewhere, no difference of resistance of tissue, and he will break up the whole eye.

Bloodletting from the arm, leeching upon the temples, purgatives, and the local application of compresses dipped in cold water, were used without delay. Two days after the patient's entrance, the anterior chamber was much clearer, and it was evident that the diagnosis in regard to the black spots in the iris was correct. The crystalline presented a slight opacity, and this opacity sometimes disappears, but it does so from the absorption of the lens. The patient, as said before, did not suffer much for a few days after coming to the hospital, but in the night of the sixth day he commenced to have severe pains, principally in the orbital region; there were, at the same time, no signs of a recurrence of the inflammation. As the anterior chamber became more perfectly clear, there was an appearance as if of a grayish body, placed in the upper part of the opening made in the iris; it seemed as if a metallic body was placed there. It resembled so much a shot of lead, that on the seventh day M. Nélaton thought himself justified in making an opening into the cornea, and introducing an instrument in order to extract it. The small forceps used for this purpose seemed to touch the body, and yet there was not the slightest feeling of meeting it. After a few attempts, M. Nélaton thought it best to desist, for the incision into the cornea and the contact of the instrument had given rise to an effusion of blood, which obscured everything. He said he should esteem himself fortunate, if he could preserve the good appearance of the organ.

When the boy left the hospital, there were but slight traces of the wound in the cornea remaining; the sight in the eye had not improved, and the neuralgic pains continued.

Cataract.

From lectures delivered by M. Nélaton upon thirty-one different cases of cataract, the following selection has been made.

Great abuse has been made of divisions and subdivisions as respects different kinds of cataract, yet the importance in practice of recognizing certain principal varieties, on account of the indications proceeding therefrom, as to the proper operation to be performed, cannot be denied. M. Nélaton, therefore, divides cataracts into three great classes.

1st. Membranous Cataracts; 2d. Lenticular Cataracts; 3d. Capsulo-lenticular Cataracts.

The first class, of membranous cataracts, is divided into anterior capsular, and posterior capsular.

The lenticular are divided into hard, semi-hard, and soft.

The capsulo-lenticular are divided into interstitial, congenital, and cystic.

The variety called by M. Nélaton interstitial, is the one generally known under the name of the cataract of Morgagni. According to this author, it is purely and simply the result of the opacity of the liquid which normally exists between the crystalline and the capsule. This idea, however, no longer appears to be admissible, and, as M. Malgaigne has with reason observed, the alteration of a liquid would suppose a morbid change in the organ by which it is produced. The most rational opinion that can be admitted, according to M. Nélaton, in regard to the formation of interstitial cataract, is that a functional lesion exists in the capsule of the crystalline, and, consecutively, the cortical substance of the lens is altered by its contact with the product of its secretion.

In cystic cataract, the crystalline lens is absorbed, as it is in congenital cataract, but the two layers of the capsule, anterior and posterior, in place of coming in contact as they do in that variety of cataract, remain separated by the secretion of a new liquid, that takes the place of the lens. This liquid can be serous, sero-sanguinolent, or puriform.

The other varieties of cataract do not require any explanation, as the names given to them are the same with those usually employed.

Of these thirty-one cases, in six no operation was performed, in three dilaceration of the anterior capsule was practised, in two couching, and in the others extraction. Of the twenty-five cases in which an operation was practised, in two, for particular reasons, the operation was performed at the same time upon both eyes.

In performing these operations, M. Nélaton prefers to stand, the patient being placed upon a slightly elevated seat; and having the window obliquely, not directly behind, in order to avoid the reflection of the light, which would be annoying. An assistant, placed behind the patient, holds the head against his breast by means of one hand passed under the chin, while with the index and medius of the other, he holds the upper lids against the orbitary arcade. In couching, or in dilaceration of the capsule, it is not necessary to fix the eye; it is, however, in extraction, and it has been recommended to do so by means of a small hook, or by exercising a slight pressure upon the ball so as to prevent it from turning inward; this pressure, however, could not accomplish this object, and it deforms the globe of the eye, projecting the iris forward, toward the cornea, and consequently exposing it to be wounded by the keratome. M. Nélaton, formerly advised the fixing the eye by means of a small tenaculum, inserted into the sclerotic, but his further experience led him to replace it by another instrument.

The plate of this instrument, concave in order to suit the globe of the eye, is placed behind the lid at the external angle of the eye, and by exerting a slight pressure in the bottom of the oculo-palpebral cul-de-sac, the conjunctiva is fastened against the bone, and it is impossible for the eye to turn inward; in this way there is not the slightest pressure upon the globe.

The other eye should always be covered by a bandage, in order to avoid the movements of the eyelids.

If, upon any occasion, it should be thought necessary to operate upon one eye by couching, and upon the other by extraction, the extraction should always be performed first, for fear that the pain produced by the needle might determine a spasmodic contraction of the muscles of the eye on the opposite side, susceptible of forcing out the vitreous humor.

After the operation, M. Nélaton closes the lids, and keeps them in that position by means of strips of court-plaster passed from the forehead to the cheek. As to the examination of the eye afterward, he prefers to make it every day; the plaster being removed after being most thoroughly soaked with water applied by means of a brush.

November, 1851. A woman, fifty-five years of age; she had blue eyes, and M. Nélaton remarked that he had always noticed operations for cataract to succeed best when the eyes were of that color.

In this case, the pupil was occupied by a brown, compact body; the iris was slightly dilated, and, what it is very important to know, also movable; and behind it *the shadow* could be seen. Of course, if the crystalline lens and the iris are not in immediate contact, a shadow will be formed upon the former, when the light falls obliquely upon it.

The opaque body obstructing the pupil, presented reflections like those from mother-of-pearl, and, when exposed to a good light, was seen to be formed of a series of triangles, whose base corresponded to the circumference, while their summits were directed to the centre. This disposition, which is like that of the normal structure of the crystalline, showed the seat of the cataract to be the lens itself.

It is necessary in practice to know if a lenticular cataract be hard or soft, for the choice of the method of operating depends upon this knowledge. If couching be practised upon a hard cataract, it is not easily absorbed, and it remains a foreign body, in the eye; it is not uncommon to see it causing the severest accidents.

As a general rule, when a cataract is soft, it is large; and when it is hard, it is small. In this case, the signs of a small crystalline were present, not being in contact with the iris, and having a large shadow thrown upon it by a side light. The lens is contained in the posterior chamber, and when it increases in size it comes in contact with the iris, sometimes even pushing it forward, so as to render it convex in front; at the same time the pupil is dilated and immovable. In the diagnosis, age is of great importance; in a child or in an adult, a lenticular cataract is almost liquid (the hard are by far the most common in old persons); but it must not be supposed that age *excludes* soft cataract as youth does hard.

In this case, the cataract being hard, it was extracted. The operation was entirely to M. Nélaton's satisfaction; but, three or four hours afterward, the pains indicating inflammation in the eye commenced to show themselves. Always after the operation of extraction, except where anæmia or a like contra-indication exists, he draws blood from the arm, as a matter of precaution; in addition to the bleeding, in this case he had also given a dose of calomel; in spite of all, however, the pains made their appearance, spreading over the course of the principal branches of the fifth pair of nerves. In two days, the patient's mouth was sore, and the pains had passed away; the influence of salivation over affections of the cornea is *immense*. A large blister was then applied to the back part of the neck; it may have been superfluous, but it was thought better to do so.

January, 1852. A man, sixty-seven years of age, from the country, where he worked as a vine-dresser. As regards the causes of cataract, M. Nélaton believes the greatest to be hereditary predisposition, and next to that, working in the sunshine with the head stooping forward, as this patient must have done. At all events, the greater number of cases are seen in persons from the country, who are thus situated while at work. Any wound, directly or indirectly interesting the lens, may give rise to cataract, but in these different cases, the cataract is no longer simple.

In this patient, the left eye had been first affected; at the commencement he perceived small bodies floating in the air, and he had a sensation in the eye, as of foreign bodies situated therein, interfering with vision.

With the exception of the crystalline, all the different parts composing the eye were in a healthy condition. There was no dilatation nor immobility of the pupil; nor was there contact between the lens and the iris. When the pupil was dilated by belladonna, the opacity of the lens was seen not to extend entirely to its pupillary margin; this was still transparent. This opacity was nearly uniform, but not absolutely so, for by careful examination some small triangles, looking like mother-of-pearl, could be detected; the opacity was not very decided, and inclined toward the gray in its color.

Upon trying the experiment, invented by Purkinje and Sanson, two of the images were seen; thus determining the transparency and integrity of the anterior portion of the capsule of the lens.

Although it was impossible to say whether this lenticular cataract was hard or soft, yet the symptoms were rather those of hard, and extraction would be performed.

In performing this operation, M. Nélaton prefers making the flap in the superior part of the cornea. The eye being prevented from turning inward by means of the little instrument noticed above, the surgeon, holding the keratotome as a pen, and supporting his hand by placing the little and the ring fingers upon the cheek, inserts the point almost perpendicularly to the cornea in a point corresponding to its transverse diameter and about one-half a line from the edge; when, by a slight movement of extension of the fingers, the cornea is traversed, the point of the knife is brought forward by carrying the handle backward, so that the blade is brought parallel to the iris, and then it is pushed directly through the anterior chamber, with great slowness, and with great attention to the point at which it is to be made to come out. The operator should be aware that the eye has a great tendency to turn upward, and to conceal itself under the upper lid; to counteract this, by means of the back of the knife, it must be pressed down.

The blade of the keratotome having a triangular shape, when it is thus passed through the cornea, it makes a complete section of the upper half, forming a semicircular flap, the edge of which is only one-half a line from the sclerotic.

So soon as the section is completed, the assistant who supports the upper lid lets it fall before the eye, and the other assistant, who was fixing the eye, disengages the instrument (called by M. Nélaton an *ophthalmostat*) by carrying the handle toward the temple.

The second step of the operation consists in opening the anterior capsule of the crystalline. To do this, the eyelids are again opened, and the keratotome is passed behind the corneal flap, which is slightly raised up; the anterior capsule is then divided by a few incisions made from within outward, and from above to below.

Sometimes, after the opening of the capsule, the lens of itself comes through the pupil, but generally the surgeon is obliged to assist it by making proper pressure; after the escape of the aqueous humor, the form of the eye is modified, and its contents tending to come out where they meet with least resistance, pressure will cause them to issue by the opening he has effected. When, as is often the case, the lens stops at the opening in the cornea, he should not press any more against the ball, but finish its extraction by means of a cataract needle.

The superior section of the cornea is preferred by M. Nélaton for the following reasons: It exposes less than any other to the escape of the vitreous humor; it is the best, relatively to the situation of the cicatrix, which is concealed behind the upper lid; the flap, pressed upon softly and uniformly by the upper lid, is reapplied with almost mathematical exactness, the lid acting, in this case, as a protecting apparatus, while in the inferior section, the edge of the flap is constantly irritated by the border of the lower lid; moreover, the wound is not exposed to the contact of the purulent and muco-purulent matters secreted; and, what is more than all mere reasoning, experience shows it to be the best; the statistics of Jæger are magnificent, truly magnificent.

The operation, in this case, was performed by an *interne*, for, changing their hospital in the middle of January, M. Nélaton was in the habit of trusting an operation to each of them. It was followed by those pains in the neighborhood of the eye which announce the existence of inflammation in that organ; and, on the fourth day, the *interne* declared the whole cornea to be opaque, and the eye to be lost. Calomel was given, so as to produce salivation, and was continued for a week, when, on account of the debility it produces in old persons, it was thought best to stop it; belladonna was applied over the eye, and blisters were made use of on the back part of the neck. At the end of ten days, M. Nélaton, upon examining the eye, found it to be transparent in the lower two-thirds, but not perfectly so.

This patient left in March, with a very good eye, but the opacity could be seen, above all, just where the incision had been made. The *interne* had performed the operation with a little imperfection, his section in the cornea had been made a little too low; if it had been higher, the opacity left by the consecutive keratitis would have been completely concealed by the upper lid.

January, 1854. A man, fifty-seven years of age, by occupation a marble-cutter; he had a cataract in the left eye; the right had been destroyed some years before by a piece of iron. In this case, there was no hereditary predisposition to the affection, nor was his labor trying to the sight. Eighteen months before, he noticed a want of clearness in his vision, and saw small bodies floating in the air; when he came to the hospital, he said, among other things, that when he looked at the moon he saw eight of them, and when he looked at a candle, the flame had different sizes, as the distance at which it was placed was altered.

The cataract was quite a curious one; in the first place, it should be said that, with the exception of the lens, all the rest of the eye was healthy; in the pupil there was an opacity, of a greenish-yellow color, and *much* more pronounced in the centre than at the circumference; it seemed as if an opaque nucleus, much smaller than the crystalline, was placed there, at some distance from the iris. Again, when the eye was much dilated, by close inspection, small opaque lines could be seen at the circumference of the crystalline. Between these striæ and the nucleus, the lens was transparent. It was a lenticular cataract, central, and cortical; another similar cataract was in the wards at the same time, in a female patient, but in her case the central portion was the less opaque.

In extracting this lens, some of the vitreous humor escaped; it was attributed to the assistant, who had charge of fixing the eye, not withdrawing the instrument with sufficient care. Some surgeons say that one-third, or even one-half, can come out without destroying the eye; in July, 1852, a small quantity escaped for M. Nélaton, and the patient left, with a pupil not perfectly round, but still with excellent sight; on that occasion he remarked that it was the first time it ever had happened to him.

Four days after this operation, the upper lid was œdematous, indicating much conjunctival inflammation, and upon opening the lids, that condition of things was very evident. The cause of the phlegmasia here, was one often seen to compromise this operation, namely: contraction of the lids and a turning in of the eyelashes. In order to remedy this, small strips of diachylon were applied, but they became loose; serrefines were then made use of, so fixed as to seize a fold of the skin in the lower lid, and make it so short that it could not permit of being turned in. In a few days after their application, the swelling of the lid had disappeared; the cornea was perfectly transparent and almost united, the iris of its natural color, and the pupil perfectly round.

The following case shows the utility of making use of the ophthalmostat.

December, 1852. In an operation for extracting a lens, after having passed the keratotome through the anterior chamber, its point broke off, immediately after being implanted in the cornea, on the opposite side, and the triangular bit of iron fell into the anterior chamber against the iris. Upon withdrawing the knife, the aqueous humor escaped, and it was very difficult to complete the operation; this is easily understood, when the lens was in contact with the cornea, and on account of the trouble there would be in fixing the globe. By means of a pair of small-toothed forceps, passed into the conjunctiva, the eye was held, and, with a pair of scissors, the section of the cornea was completed.

This accident, the breaking of the point of the keratotome, has often happened, and M. Nélaton thought it had happened to him upon this occasion, because, contrary to his invariable habit, he had neglected to make use of his ophthalmostat. The instrument not being at hand, he proceeded without it; and when the eye turned inwards, he endeavored, after implanting the point of the knife into the internal portion of the cornea, to bring it back to a better position; in doing so, the point broke off.

In this case, the eye got well, as if the operation had been performed in the most satisfactory manner.

November, 1852. In a case in which the operation of extraction had been performed as happily as possible, the eye, nevertheless, was lost. There are some patients in whom this operation fails, and it is impossible to give any reasons for it. While making the section of the cornea, however, M. Nélaton had taken notice of one circumstance, and had mentioned it to those immediately around him; in some persons, the cornea, although presenting a healthy appearance, is softish, and, in this case, while making the flap, it seemed like cutting a moistened linen rag. This softened condition of the cornea cannot be foreseen, and, after the operation, the ocular globe will invariably empty itself.

Under such circumstances, the same operation should never be performed upon the other eye; and in this case couching would be performed. Not knowing when he may fall upon these bad cases, the surgeon should only operate upon one eye at a time, unless there be some very powerful reasons to the contrary; for one method failing of success, he must employ another.

In January, 1853, couching was performed in the other eye, because there being a hard nucleus in the lens, its absorption, after the dilaceration of the anterior capsule, was not to be looked for. When the eye was carefully examined nine days afterward, the lens was seen to be exceedingly movable; it could be seen, when the head was moved, to jump up, so to speak, behind the pupil. A movable crystalline lens is dangerous, and M. Nélaton said he would not be surprised to see an inflammation of the whole globe of the eye. In order to guard against this, the patient was purged and kept upon loose diet, and at last left with very good sight.

In May, 1854, this patient returned to the hospital almost totally blind. The cornea was transparent, but it was not regular; it was deformed by the pressure of the upper lid; it was evidently soft and flabby. The color of the iris was not natural; it was yellow, *bordering upon a green*, a characteristic color, often coinciding with disorganizing internal inflammation. Moreover, the ball itself of the eye was commencing to have a square form; impression of the muscles upon it could be seen; the organ was in a state of atrophy.

In the following case, also, M. Nélaton thought couching the best operation.

July, 1853. A man who was occupied as a cook, and therefore exposed to a strong light. This, however, should not be considered as the cause of his affection, for he had inherited a predisposition to it; his grandfather and an aunt had been affected with cataract.

Twelve years before, he perceived the first symptoms of the condition of his eye; having occasion to cover one eye, he found he could not see with the other. Some time before, he had had an attack of erysipelas of the scalp, that had commenced in the eyelids, and the traces of long incisions, which had been made on account of this disease, were still visible in the temporal region.

Whatever may have been the cause of the cataract, it was not such a one as is usually seen from old age and hereditary influence. When the pupil was largely dilated, an opaque field was seen, not uniformly opaline, but whiter in some parts, and more transparent in others; moreover, one part was yellow, as is seen in the cataract of old persons. M. Nélaton thought this was a rare form of cataract, one in which the lens is opaque, and also the posterior layer of the capsule, while the anterior is still transparent. If this were so, he should have had the reflections of the cornea, and of the anterior capsule, when a candle was held before the aqueous humor escaped, and it was very difficult to complete the operation; this is easily understood, when the lens was in contact with the cornea, and on account of the trouble there would be in fixing the globe. By means of a pair of small-toothed forceps, passed into the conjunctiva, the eye was held, and, with a pair of scissors, the section of the cornea was completed.

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Here, the capsule was diseased; it would be found coriaceous and difficult to cut; it was not at all a case for extraction, and couching was to be preferred.

The lens with its capsule was depressed, a place being previously formed for it in the vitreous humor, without which, M. Nélaton said, it would rise again. The patient was bled immediately after the operation, and several doses of calomel were afterward administered; besides, a bladder containing ice was kept applied over the eye for six days. At the expiration of that time, the pupil being largely dilated, no opaque body was visible, and the patient left with very good sight.

In November, 1853, when M. Nélaton entered upon his duties, after the summer vacation, there were three patients in the wards, two in the male and one in the female, who had been operated upon by couching, by M. Vollemier, who had occupied his place during his absence.

No. 1. In the right eye, the pupil was quite large, not much deformed, and filled with false membranes. In the left eye, the pupil was normal; there were no adherences, but at its lower edge was a small shred, probably the remains of the capsule; behind the lower portion of the iris, the lens could be seen, and it was to be feared that it was too hard to be absorbed, and would give rise to an inflammation, destroying the eye.

No. 2. In the right eye, the pupil was deformed; it contained false membranes, and it scarcely permitted the patient to distinguish an object. In the left eye, when the pupil was largely dilated, it was seen to be occupied by a false membrane, not very opaque above, but very much so below.

No. 3. Both eyes were in the same condition; the pupil in each was occupied by an opaque body, which was the crystalline lens that had again ascended; though both eyes were good, still another operation was necessary.

In calling attention to these cases, M. Nélaton said that it was only with the view of saying that the operation of couching is not what persons claim it to be. In former times, he also had been its *partisan*, as indeed he could not be otherwise, for Dupuytren and Sanson, of whom he was the partisan also, performed this operation.

In these cases, the false membranes were torn, and rémoved as much as possible from the axis of vision, by means of a needle introduced through the cornea. M. Nélaton said he would have preferred extracting them, but he feared lest the existence of the crystalline, a foreign body in the eye, would render the organ very susceptible to inflammation.

At a later period, for the removal of false membranes from the pupil, an instrument was devised by M. Nélaton; none of them, however, had as yet been constructed by M. Charrière, to whom the plan was given, when I left Paris, and consequently I am unable to speak of its results. The instrument is described in the following case:—

March, 1854. A cataract, operated upon by extraction. Everything went on most favorably; the eye was in an excellent condition, except that a false membrane, a strip of the capsule, remained in the pupil. This is seen, in some cases, even after extraction. These false membranes are not very easy to get off; they tear; they can even be put out of the way by depression, but they come up again: they are like caoutchouc. On this account their extraction has been advised, and instruments have been invented for the purpose; one of them, for instance, is shaped like Hunter's forceps. It is not so easy to manage them as might be supposed, for, when the cornea is punctured, the iris falls forward in contact with it; the iris, when touched, contracts, and it is then very difficult to proceed with the operation.

M. Nélaton thought that an instrument could be constructed, by which the anterior chamber could be preserved, after it had traversed the cornea. This instrument has a pointed extremity, that can be divided into two; when it has been pushed through the cornea, as any simple pointed instrument, by pulling back a wire, the point separates into two portions, opened like the blades of sharp-pointed scissors; these points are planted directly into the false membrane, and by pushing forward a canula, which is around the whole instrument, the points are brought again together, and the membrane is firmly held; by a rotary motion, it is then torn loose. It remains to extract this false membrane, rolled around the point of the instrument; if pulled directly out, it most probably would remain in the hole in the cornea; for this purpose, there is at the side of the instrument a small blade, by which the hole can be enlarged, and the membrane thus pulled away.

February, 1853. A cataract. The whole pupil was slightly opaque, nebulous, with portions, irregularly placed, of a dull white color; there was no shade formed upon this opacity of the iris; the two were in immediate contact, but still there was no adhesion. The anterior capsule was evidently opaque, and M. Nélaton said he would extract it by means of a puncture in the inferior external portion of the cornea, and the introduction of a pair of small forceps. If the crystalline lens should be found opaque, it would be left to undergo absorption.

This puncture was made of the smallest possible dimensions, in order to preserve an anterior chamber, so that the forceps might be manœuvred without touching the iris. When the forceps were introduced, however, a good deal of the aqueous humor escaped at the side. The false membrane was pulled away without any difficulty; a very white spot upon it was of bony hardness; M. Nélaton called it an ossification.

Such an operation was liable to be followed by much inflammation, and the patient was largely bled, and ice was kept in contact with the eye. Everything, however, proceeded very favorably; two days afterward there was a slight injection of the conjunctiva, but nothing in the cornea, where the opening had reunited; the anterior chamber had formed again, the iris had its normal color, and the pupil was of moderate dimensions. Some iritis had been expected, but none took place. In the pupil was an opaque body, which was the lens left there to soften, to spread into the anterior chamber, and to be absorbed, as in other cases hereafter related.

April, 1852. A case of cataract; curious on account of its complications. Both eyes were affected; on the left side, on examining the pupil, which was well dilated and movable, a small white spot, half a line in diameter, was seen in the centre, and all around it the opacity had a yellow tint. The white spot was upon the capsule; the rest of the membrane had preserved its transparency. The other membranes, constituting the eye, were healthy.

Upon the right side, the eye being under the influence of belladonna, the pupil was most irregular; internally, it was circular, but not dilated; the iris, there, was attached to the capsule of the crystalline; externally, it was dilated nearly to the circumference; the body filling the pupil was yellow in the centre of the eye, but in that portion revealed by external retraction of the iris, it was of a dull white color, with here and there small spots of uvea upon it, that had remained adherent to the capsule. The cataract was capsulo-lenticular, with adherences to the iris.

In this case, the right eye would first be operated upon, because it was the most unfavorable one. It would be necessary to destroy those adhesions, and that is very difficult to do. After the section of the cornea, the escape of the aqueous humor, and the application of the iris to the posterior surface of the cornea, the surgeon may destroy the adhesions by rubbing the eye; this, however, is a proceeding of extreme delicacy. It was proposed by M. Nélaton to pass a needle behind the iris, and separate it in that way; if it could be done with facility, the lens would be at once extracted; if not, he would withdraw the instrument, and afterward, by the use of belladonna, keep the parts from again reuniting.

The detachment was made with the greatest ease, and the eye got well, as if it had been in a most favorable condition for the operation.

In cases similar to the above, however, the operation of extraction is no longer performed by M. Nélaton, as will be seen from the following case.

April, 1854. Cataract in both eyes; the left eye was the worse, and it was therefore chosen for the operation. Upon that side, the pupil was irregular; the dimensions were normal, but the border was not entirely regular—there were notches in it, still more apparent when the eye was under the influence of belladonna. In the field of the pupil was an opaque body, that presented itself with all the characters of a false membrane; it was opaque, of a dull white color, with here and there black spots upon it, which, it was easy to see, were small pieces of uvea. When an opaque body was passed before the eye, the patient could perceive the shadow. It was not certain whether the crystalline, behind, was opaque or not, but it most probably was, for in these cases they generally are, and, moreover, the lens of the other eye was opaque.

For these particular cases, M. Nélaton said his experience had taught him to renounce extraction, for it exposes too much to the loss of a great portion of the vitreous humor. In this patient, then, although the cataract was hard, and therefore unfavorable for couching, he would perform that operation. The needle would be introduced through the sclerotic, and being passed above the lens, would be passed, if possible, between the crystalline and the iris, so as to tear the adhesions; when loose, the lens would be depressed toward the external portion of the eye, for there it is generally placed.

The false membrane was detached with the greatest ease, and, contrary to what had been supposed, the cataract was soft.

In the following case, after the operation, there was procidentia of the iris.

November, 1853. A man, from the country, where he was occupied in cleaning wool. The work fatigued his eyes, and he often made use of spectacles, and one day, about three years before his entrance into the hospital, when selecting some glasses, he found *at once* that he was unable to see with the right eye. M. Nélaton has very often found that the crystalline lens became opaque without the patient having noticed the gradual failure of vision. A short time previous, a woman had been in the hospital who had never known that anything was the matter with her sight, until, one day, having some difficulty in threading a needle, she went to a window, and, shutting one eye, found she was unable to see at all with the other.

This patient's eyes were perfectly healthy, with the exception of the crystalline. In the eye, the opacity was opaline, with a slightly yellowish tint; the pupil was normally dilated, and movable, and the shadow, thrown by the iris upon the crystalline, was quite large. In the right eye, the pupil was opaque, and there were striæ of playing colors, like mother-of-pearl (*nacrées chatoyantes*), running from the periphery to the centre; in this eye, the central portion was hard, and the circumference was softer. It is not rare, in the progress of a hard cataract, to see a softening of the circumference of the lens, which had remained transparent; and this transformation is announced by these striæ.

The operation of extraction was performed upon the right eye. A week afterwards, M. Nélaton said, everything was going on very well, but that it seemed to him as if the flap in the cornea had not perfectly adhered, and that there was some procidentia of the iris, not of the free border, but of the circumference. He said, however, that experience had shown that this was no serious matter; that the portion of the iris would, at last, disappear, and but a slight deformity of that membrane would remain; in four or five weeks, in this case, the cure would be complete.

Instead of improving, however, the condition of the eye became worse; the iris engaged itself more and more in the incision, and the flap of the cornea was slowly more and more disunited. Five weeks after the removal of the lens, that is, as soon as he thought it proper to do so, M. Nélaton cauterized that portion of the iris that was projecting; not deeply, however, the caustic being left in contact with it but two or three seconds. The ensuing night the patient suffered a great deal, and the next day the eye was greatly injected, and the hernia had all disappeared; the anterior chamber was gone, the iris was in contact with the posterior surface of the cornea. Some belladonna, in solution, was dropped into the eye, and the day afterwards the pupil was dilated, and almost perfectly well placed; a result both satisfactory and unexpected.

The third day, it seemed as if there was a slight tendency to a new hernia; and M. Nélaton said he should not be surprised to see one, as the aqueous humor was secreted again. The hernia was again formed; and a few days afterward, while M. Nélaton was absent from indisposition, the patient left the hospital in that condition.

The effect of the cauterization in this case is very important, and it puts the surgeon in the way of curing these cases of hernia of the iris, which are not exceedingly uncommon, particularly after the inferior section of the cornea has been practised.

The following case is one of congenital cataract, interesting chiefly from its diagnosis as such.

April, 1853. A young girl, eighteen years of age, in perfect health, with no vicious diathesis. Five years before, she said, she had experienced the first symptoms of any affection of her eyes; on several occasions they became red and painful; and, in her opinion, it was in consequence of these attacks that she was then deprived of sight in one of them. M. Nélaton, however, was not disposed to agree with her in this opinion. When the eyes were examined, it was easy to see the traces of keratitis, and every one knows how subject that affection is to relapse; apart from this condition of the sclerotic, the integrity of the eyes was perfect; with the exception, of course, of the condition of the lens on the right side; on both sides the pupil was contractile and perfectly circular, and the iris of its natural color.

The opaque body, in the pupil of the right eye, was the type of capsular cataract; the color, of a dull white, in some places seeming to be slightly transparent; the surface not perfectly smooth, it had the appearance of an opaque body, upon which a thin layer of torn, moistened cotton wadding had been placed. But, in this case, the capsule was not in contact with the iris, and unless the lens were smaller than natural, it would have been, by being thickened. How was this to be explained? The cataracts from inflammation are generally pseudo-membranous; the capsule being thickened by the coagulable lymph, it touches the iris, and generally adheres to it, and when the pupil has been dilated by belladonna, the deformity is very manifest. This cataract was not to be believed to be the result of an inflammation—it was a congenital cataract.

Congenital cataract undergoes very curious modifications, which, in practice, it is important to be well acquainted with. At the commencement it is soft; the capsule and crystalline are both opaque. The crystalline becomes more and more diffluent, and, in proportion as it loses consistence, it is absorbed, so that, after a certain time, towards the age of twelve, fifteen, or twenty, it has completely disappeared. Whilst this absorption is taking place, the anterior lamina of the capsule recedes from the iris, so as to approach the posterior layer, with which, at last, it comes in contact. In this case, then, M. Nélaton thought the crystalline had all been absorbed, and thus the unusual fact of a capsular cataract with the iris at some distance from it, could be explained.

In this case, the capsule might be torn and put out of the axis of vision, or it might be extracted; there was no great reason for one or the other.

Extraction was performed; a small layer of crystalline still existed between the membranes; the operation succeeded perfectly.

February, 1852. A young man came to the hospital on account of the condition of his left eye. His eyes were blue, and, in comparing them, a notable difference was seen in their tint; the iris of the left side was greenish, and its brilliancy was much diminished—signs of a preceding iritis, by which the membrane had been changed. After the application of belladonna, the external inferior portion of the iris remained uninfluenced, forming, thus, an entering angle, as it were, into the circle; just at the point of this angle was a large white spot, and over the whole pupil thus displayed was a sort of cloud, formed by filaments radiating from this spot, with more transparent portions between. There was adhesion of the iris, and pseudo-membranous opacity of the membrane of the lens; the white spot was a pseudo-membranous, plastic deposit, which had served also to establish the adhesion to the iris. As to the condition of the lens itself, it was believed to be in a state of complete liquefaction, for when the eye was quickly moved, the scintillation of small flakes of cholesterine could be perceived. As to the functional condition of the organ, the patient did not suffer at all in it, but it did not preserve even the power of distinguishing day from night.

M. Nélaton was not disposed to operate in this case; as an organ of vision, the eye was lost, and as to the deformity, it should be suffered to remain, rather than run the risk of exciting inflammation of the eye, which, on account of the preceding pathological changes, would almost inevitably take place. A false membrane, consecutive to a congenital cataract, can be removed without giving rise to any accident; the result is always most satisfactory, but here it was very different.

April, 1852. A young woman, twenty years of age, affected with cataract, of a variety not very often met with. At the age of thirteen, she received a blow upon the eye, which gave rise, it is probable, to deep-seated traumatic inflammation; cataract succeeded, from opacity of both the lens and its capsule.

The pupil, at its lower internal portion, presented some irregularities, with adhesion of the iris there to the capsule; this portion was in extent about one-sixth of the whole circumference of the pupil. In the centre of the capsule was an irregularly circular, opaline spot, covering about one-third of the exposed pupil, and around it were a number of very small spots of the same color; near to the most internal part of the adherent portion of the iris, was a small black spot, which was a small piece of uvea that had remained after the tearing of an adhesion of the iris. The rest of the capsule was transparent, and the lens behind was seen to be opaque.

This patient M. Nélaton wished to operate upon, but she was herself unwilling.

The following three cases are interesting in a diagnostic point of view.

July, 1852. A woman, fifty years of age, much sun-burnt, from the country. Whether field-work exposes to cataract is still a question; but it is an incontestable fact, that the affection is more often seen in the country than in the city. In this case no hereditary predisposition existed. The patient complained of a failure of the power of vision; in a bright light, it was much more feeble than in obscurity.

The right eye was still perfectly transparent, but, nevertheless, she said that she could not see well with it. In such cases the diagnosis is very difficult—you see the three images reflected, when a candle is held before the eye, and you pronounce it amaurosis, although the pupil still preserves its contractility; and then afterward, little by little, a cataract is seen manifesting itself. M. Nélaton said that he was not acquainted with any symptoms, by which every doubt could be removed, under similar circumstances. He believed that there was, in this case, *the loss of vision, which shows itself before the loss of transparency.*

In the left eye was an opaque body, upon which quite a large shadow was thrown by the iris. It was a lenticular cataract, but those mother-of-pearl triangles were absent: probably they were hidden by an intervening liquid. This M. Nélaton believed to be a lenticular cataract with a softening of the periphery, forming a layer around the hard central portion.

This patient had projecting eyes, of which authors speak, but M. Nélaton said he did not dread them. The operation of extraction was performed upon the left eye with complete success.

January, 1853. A man, about fifty years of age. The pupil of the right eye was perfectly normal in its conformation; it was largely dilated, and contained a cataract, which had resulted from a wound. The eye had suffered long before; it was, however, from perceiving that the sight in the left eye was commencing to fail, that this patient came to the hospital. In that eye there was nothing to be seen, it was absolutely normal, and yet M. Nélaton believed that there was a cataract incipient there. He knew well of several similar cases, of three, particularly, pronounced to be incurable amauroses by the best ophthalmologists of Paris, which afterwards proved themselves to have been cataracts. He referred, also, to the patient who is mentioned in the preceding case, where he had operated upon the right eye, and although nothing abnormal could be detected in the left, he still was authorized to diagnose a cataract. As in that case, he here repeated the experiment of Purkinje, of the three images. To see them well, it is advisable to have the pupil dilated; the candle being held before the eye, you see a first image situated upon the cornea, and a second placed more deeply; both move in the same direction with the candle; as to the third image, it is small, but very bright, and it moves in an inverse direction. The first image is the reflection of the cornea, the second of the anterior capsule, and the third of the posterior. In this patient, as said before, the three images were visible; the crystalline was transparent, and yet the sight was affected. It seems as if there was something else than the opacity in cataract; something takes place in the intimate structure of the crystalline.

November, 1853. A young woman, apparently healthy, with a cataract, at a period of development not often seen, and in which a mistake in diagnosis is easily made. When the eyes were regarded, they appeared to be perfectly normal; there was no injection anywhere, no signs of preceding disease; the pupil was dilated and perfectly transparent, no *material* trouble could anywhere be detected, and yet this patient could not see.

Want of vision and no material disorder, would make the case one of amaurosis; a more profound examination, however, left no doubt but that the case was one of commencing cataract. In such cases, the experiment of Purkinje, the test of the three images, is of no use whatever; the following is the only method of detecting them. Dilate the pupil, and, carefully examining the circumference of the pupil, a complete or nearly complete *crown* of small opaque spots, of small radii, extremely numerous, will be found. In this case, this was all that could be seen, after the complete dilatation of the pupil, in the right eye; in the left eye, the radii were more prolonged, and there was besides an appearance of one line running diametrically through the centre, and of another meeting it at nearly a right angle in the middle.

This patient remained but a day or two in the wards.

It will have been noticed in all these cases, that when an operation has been performed, but one eye at a time has been operated upon; and, moreover, that the less favorable of the two eyes has always been chosen for the first operation.

In regard to the propriety of operating upon both eyes at the same time, the opinions of surgeons are very much divided, and there are excellent authorities on both sides of the question. Wenzel, Boyer, Pellier, Graefe, Rosas, Jæger, Quadri, Forlense, M. Roux, operate upon both eyes at the same sitting; on the other hand, Scarpa, Demours, Dupuytren, M. A. Petit, S. Cooper, Maunoir, Travers, Rossi, &c., prefer to operate upon them successively and after the lapse of some time. M. Nélaton, without denying that it may be indicated in some cases to operate at one sitting upon both, and it will be noticed that he found occasion to do so twice in the cases here reported, believes that it is preferable to operate upon the second cataract some time after the first. Indeed, if the close sympathy that exists between the two eyes be considered, it will be understood how, in operating upon both the same day, the inflammation arising in one can react the more easily upon the other, that this one is already more disposed, by the fact of the operation, to feel its influence. There would be then two inflammations to treat, instead of one; and these accidents would be so much more difficult to cure, as each one finds a stimulus in the morbid condition of the eye of the opposite side, as Scarpa very judiciously remarks. Moreover, in certain patients, the operation fails without your being able to account for the want of success, and, under these circumstances, in the second operation you can avoid those accidents that caused the first to fail, by employing another method.

The two cases in which both eyes were operated upon by M. Nélaton are the following:—

June, 1853. An old man, seventy-nine years of age, with cataract in both eyes; in the left, it was the type of senile cataract, hard and of a yellowish tint; in the right, the cataract was capsular, the lens and iris were in contact, and the opacity was not uniform, but looked as if caused by pieces of wet cotton wadding.

Here, M. Nélaton said, he would perform extraction, and upon both eyes at the same sitting; and for this reason: many old persons do not attach importance to the performance of their functions, and this old man had to be urged to undergo the operation; if the first were unsuccessful, he could never be induced to submit to a second, and, therefore, as there was, as a matter of course, more chance in two than in one, the two eyes would be operated upon at the same sitting.

When belladonna was used, the pupils did not dilate well, and became oval rather than circular; and this, particularly on the right side, seemed to be owing to the existence of adhesions between the iris and the lens. This condition was very unfavorable to extraction, but it was, nevertheless, decided to make use of that method of operating.

If the pupil is not dilated, some difficulty may be had in making the lens come out; in that case the surgeon should not employ too great pressure upon the globe, but he should make a slight incision into the pupillary margin of the iris with a pair of blunt-pointed scissors.

In operating upon the left side, so soon as the cystitome was used, by a sudden movement a large portion of the crystalline was forced out of the opening in the cornea; the rest of the lens must have gone into the posterior chamber. Upon the right side, after opening the capsule, and making the usual pressure upon the globe, the lens would not come out; the pupil was, therefore, enlarged, as above described, and in so doing, of course, a small vessel was divided. In spite of all this, two days afterward, the eyes were in an excellent condition; the blood was all absorbed, and the lower two-thirds, at least, of the cornea were transparent. It was not thought proper to raise the upper lid sufficiently high to look at the rest of that membrane.

Seven days after these operations had been performed, this patient went out with very good sight. M. Nélaton said that although the cornea had perfectly united, still it was not as yet solidly united, and a sudden movement, as, for instance, the striking of the eye, from a bright light, might break up the adhesions.

April, 1854. In an operation for extraction, after choosing the worst eye, for both were affected, M. Nélaton made the section in the upper portion of the cornea, as usual, and entirely to his satisfaction. The capsule of the crystalline was divided by the cystitome, but when pressure was applied to make the lens come out, it was arrested at the opening in the cornea, and some of the vitreous humor exuded. As a general rule, the cause of the difficulty is, that the opening in the cornea is not of sufficient size; here, however, it was. After making a few attempts to hook out the lens, it was left in the anterior chamber, and the eyelids were closed.

M. Nélaton proceeded at once to perform the same operation upon the other eye. This was contrary to his custom, but he did so for the reason that what he had already done in the other eye could have no satisfactory result, and a failure is generally the cause why patients do not wish a second operation.

In the one eye no accident happened, and the patient had very good sight with it; the other was left, according to his own desire, with the lens still in the anterior chamber.

M. Nélaton took this occasion for again stating his preference for the superior section of the cornea, and his reasons, both theoretical and experimental, for so doing.

Consult the statistics, the honest, reliable statistics of Jæger and of Roux, the former operating by the superior section, and the latter by the inferior; while M. Roux was successful in sixty-five cases in a hundred, the other was successful in ninety-five. It must be remembered that the number of patients, not the number of eyes, is meant. Both these surgeons operated on both eyes at the same time. Now, suppose that upon ten patients both eyes were operated upon, and one eye in each case was successful, that would make ten cases successful in ten patients, while counting the eyes, there would be ten cases successful in twenty. Jæger never pretended to cure ninety-five out of one hundred eyes.

Now for the theory: The vitreous humor must come out more easily below than above; hernia of the iris is said to occur more easily below; without thinking the difference to be so great as has been said, it does, however, really exist. The destruction of the eye by suppuration (the *fonte purulente* of the eye) is more common after the inferior section, and it is to be accounted for in this way: the section in the cornea in this case corresponds to the separation between the lids, as every one has noticed; the day after the operation, the lids are glued together by the discharge; now, if the wound in the cornea be in contact with this purulent mucus, it may become inflamed, and the inflammation may extend; moreover, when there is pain, the lids are involuntarily contracted, and the lower lid is often turned inward, and the lashes come in contact with the wound. Beside all this, if a slight inflammation near the incision should take place, and some nebulosity of the cornea result—when the section has been made in the upper part, it will be so situated as to be covered by the lid in its usual position. The superior section is said to be more difficult, and there is some truth in this, but the difficulties are easily overcome.

The three cases of cataract in which M. Nélaton operated by dilaceration of the anterior capsule of the lens, are the following:—

December, 1852. A young man with cataract. There was no hereditary predisposition to the affection, nor had any violence ever been suffered by the organs; besides, violence generally produces capsular cataract, and here it was lenticular, with all the characteristics of cataract occurring in a young person. In old persons, in lenticular cataract, the color is of a greenish yellow; the pupillary orifice is not enlarged; a shadow is thrown by the iris upon the opacity, and the iris is movable. In this case could be seen the triangles, the index of the lenticular cataract; the color was opaline, slightly bordering on blue, as the color of milk mixed with water; the pupil was large and movable, which is the exception in these cases; but there was another disposition of the iris, which it is very important to determine—it was pushed forward, the sign of a cataract having a considerable size, and such are generally soft.

In the treatment of cataract, M. Nélaton said he was an advocate of extraction, but as a general rule, when the cataract was soft, he practised depression, or else the breaking up of the lens, knowing that most probably the lens would be too soft to be pushed down.

There are two methods of practising the breaking up of the lens: in one, the needle is introduced behind the cornea, through the sclerotic, as in depression; in the other, the needle is introduced through the cornea, as in extraction. After depression, although the pupil is freed from the opacity, a severe ophthalmia often takes place, resulting in amaurosis; and, beside the inflammation which may take place, violent neuralgic pains are not unfrequent. By passing the instrument through the cornea, M. Nélaton believes that these accidents would be avoided; when passed behind the cornea, the wound of the sclerotic, to be sure, is nothing, but if the instrument be a little too far forward, the circle is wounded, and if a little too far backward, the retina is injured. Everything that can be accomplished through the sclerotic, in the way of tearing up the lens, can be accomplished through the cornea, and that membrane alone can be wounded.

Some surgeons have introduced a needle through the cornea, and torn the anterior capsule of the lens, in order that it might be brought in contact with the aqueous humor, and thus absorbed. One surgeon, of Paris, by whom this had been done, told M. Nélaton that the absorption was completed in fifty-two days; he had practised the operation upon one occasion himself, and four months elapsed before the opaque portions had entirely disappeared. In this case, he said, he would repeat this operation, the only objection to which was the length of time necessary for the accomplishment of the ensuing phenomena, and this should not deter the surgeon from employing it.

A common cataract needle was passed through the cornea, at the inferior and external part of that membrane, and by it the capsule was opened, and some lacerations made in the lens. The next day there was some trifling congestion of the eye, which soon disappeared. As to the wound of the cornea, a small white spot, that could with difficulty be perceived, was all that remained of it; the crystalline, swollen, had pushed out from the opening in the capsule, and again forming an enlargement, when seen from the side, had the shape of an hour-glass. After remaining apparently stationary for a few days, the absorption commenced, as was seen by the gradual disappearance of the portion protruding before the capsule; in thirty-four days, the whole of this portion was absorbed. On the thirty-ninth day, the pupil was filled with opaque matters, resembling white clouds, with transparent portions intervening. On the forty-fifth day, there was but one white flake remaining, which was attached to the iris by a pedicle; this pedicle was absorbed, and the opacity fell into the anterior chamber of the eye, where, by the fiftieth day after the operation, it had entirely disappeared.

April, 1853. A man, thirty-nine years of age, who, without receiving any injury, saw a cataract begin to form, thirteen years before, in his right eye; it was, therefore, a cataract recurring in early life. The pupil, not previously dilated by belladonna, was of the average size, movable, and very impressible to light; in it was an opaque white body, upon which a shadow, the breadth of which was rather narrow, was thrown by the iris. The color of the opaque body was uniform, and bluish-white; that peculiar tint, however, in this patient, was not very well marked. When the pupil was very largely dilated, those triangles were seen, which show a cataract to be lenticular; though a cataract may be lenticular without their being visible.

It was somewhat doubtful, in this case, whether the cataract was hard or soft; it was, however, most probable that one part of it was soft, and one part, the central portion, hard, for the volume was not very considerable, as the existence of a shadow showed. As a general rule, cataract occurring in early life is soft.

What operation was adapted to such a case as this? While hunting over some books, in order to write a thesis upon cataract, M. Nélaton said his attention had been drawn to a method of operating mentioned by an English surgeon, named Ware. He, having observed that the lens, deprived of its capsule, was absorbed, thought it would be a good thing, in cases of cataract, to place the lens in such a condition without removing it from its place. About the same time, M. Nélaton was attending a butcher boy, who, in cutting a mutton-bone, was struck in the eye by a splinter, that went through the cornea and the anterior capsule of the lens; he watched the case, and, combating the inflammation, he saw, in a few days, hernia of the lens take place through the opening in the capsule, and finally the whole was absorbed, and the opacity disappeared. Similar facts were communicated to him by other surgeons. Some time afterward, the wife of a physician went to him with a cataract in one eye; she wished, principally, to be relieved of the deformity caused by the whiteness of the pupil. Extraction is an admirable method of operating, but if unsuccessful, the deformity is far greater than before. Depression often fails; the crystalline comes up again; deep-seated acute inflammation often occurs, which may be cured so as to leave the eye transparent, but not possessing the power of vision; and, again, it sometimes gives rise to frightful neuralgic pains, lasting five, six, and twelve months. In that case, therefore, M. Nélaton proposed to perform the operation he had seen described by the English surgeon, the opening of the capsule; and this he wished to do through the cornea, for the neuralgia and the deep-seated inflammations, observed after depression, are owing to the wounding of the anterior portion of the retina by the needle; wounds of the cornea itself are very simple. A very thin needle was passed through the cornea, half a line from the edge of the cornea, and the capsule was largely opened; not the slightest effort, it must be understood, was made to depress the lens. It was easy to follow the changes which took place from one day to another in the eye; absorption of the lens went slowly on, when suddenly it ceased; why, it was impossible to tell. Thinking that perhaps some capsule was around what was left of the lens, the needle was again introduced, after which absorption commenced again; and, afterward, it was a third time found necessary to introduce the needle; finally, at the expiration of four months, the whole of the lens was absorbed and the pupil was left clear. The second case in which M. Nélaton performed this operation, is the one related above; in this the absorption took place more rapidly: it was completed in fifty days.

In this patient, this same operation would be repeated. The lens was not everywhere soft, which perhaps would prove a contra-indication to the operation, but it would do no harm to make the experiment for the worst that could happen would be that some would be left unabsorbed, and that could be removed afterward by extraction or by depression, as might seem desirable.

In the other cases, the ordinary cataract needle was used, but it was found not to be very well adapted to this operation, for the lance-head is so small you cannot see it with the necessary clearness. M. Nélaton had another instrument constructed, the head of which is shaped like a pruning-knife, and he found it to answer better in this case. After the division of the capsule the lens fell into the anterior chamber, where it gradually diminished in size. The central portion was very hard, and it was doubtful whether all would be absorbed; unfortunately the man left thirty-five days after the operation, and did not return.

June, 1853. A boy, seven years of age, with cataract in the left eye. It had made its appearance two years before, and rapidly developed itself; its color was a uniform bluish-gray, resembling starch (*empois*, which means starch boiled in water), the best sign of soft cataract. It was a most excellent case for practising dilaceration of the capsule, which, indeed, is only suited to cases of soft cataract, and this would be performed by passing the instrument through the cornea, which M. Nélaton considers an essential condition of this operation.

The day after the operation, which was performed exactly as in the preceding case, and which, moreover, is one of extreme simplicity, the opening in the cornea had entirely disappeared; it was impossible, from the condition of that membrane, to say which eye had been operated upon. This operation, however, although extremely simple, like everything else that is new requires some experience; the laceration in the capsule united by first intention, from not having been made sufficiently extensive. In order, therefore, to do all that was wished without any opposition from the child, who the first time had closed his eyes and pulled his head away, at the second operation a little chloroform was administered, sufficient to keep the boy quiet, but not enough to render him insensible. While performing the operation, M. Nélaton called the attention of the class to the curious manner in which the pupil at once contracts when the capsule is touched. When it was evident that the operation had been properly performed, and that the absorption of the opaque body was being accomplished, the boy left the hospital, and never returned to show himself.

Strabismus.

March, 1852. A woman, about forty years of age, who complained of double vision, and of the condition of the right eye.

She related that, twelve years before, she had been attacked suddenly with weakness of vision in the right eye, unaccompanied by any other symptoms. After a treatment, which had consisted chiefly in the application of blisters to the temple, this weakness disappeared. She had also had a second attack, exactly similar; in this the same treatment was pursued, with a similar result. This time, the third attack, together with the loss of vision, there was also strabismus.

This patient stated, also, that she was subject to nervous attacks, without loss of consciousness; in other words, to hysteria. In addition, she said that, six years before, she had had a blennorrhagia, and shortly afterward a chancre, which was followed by secondary symptoms, alopecia, cutaneous eruptions, &c., and for which she had undergone a long course of treatment.

When this patient came to the hospital, the right eye was drawn strongly inward; she was unable to turn it outward; the pupil was regular, and normal in its dimensions; it was not discolored, nor had it any adhesions. There was no symptom of paralysis, nor, in fact, of disease of any kind in any other part of the body.

What was this affection? In the first place, it was difficult to suppose that the affection was cerebral, from the fact of the exact circumscription of the nervous disorder; it was, indeed, impossible to believe it caused by an effusion in the substance of the brain. The affection was simply an hysterical paralysis, affecting the sixth pair of nerves. It should be noticed, also, that there was a notable diminution of the sensibility of the eye; when the conjunctiva was touched, there was no winking. This hysterical paralysis is almost always upon the left side.

The treatment of this case was entirely medical; and, under the administration of antispasmodics, the patient rapidly recovered.

June, 1852. A young woman, whose right eye was in the proper direction; the left, however, was deviated, the pupil being almost entirely concealed behind the internal angle. The degree of strabismus was so extreme that it would be proper, under the circumstances, to perform an operation for its relief, although operations in such cases have of late years fallen into great discredit.

When the right eye was closed, so that the patient was forced to bring the left into use, it was seen that the power of vision was not equal in the two eyes; she was short-sighted in the left eye. When the right eye was then opened, the left still remaining in the proper position, the patient saw two objects, one much more distinct than the other. This fact was in accordance with the opinion of Buffon, who attributed strabismus to an inequality in the power of the two eyes, so that the feebler eye, become useless to vision, was instinctively turned aside, so as not to trouble by an indistinct perception the normal vision of its fellow. It may be, however, as some modern authors maintain, that this illustrious naturalist has taken the effect for the cause, for in cases of strabismus from muscular paralysis, this inequality of power is likewise met with after a certain time.

It should also be stated, that this patient had never suffered from pains in the head, or from convulsions, or other nervous disorders. The strabismus was not to be considered as the result of a paralysis of the external rectus muscle, but as caused by an excess of muscular contraction of the internal.

After the section of one or more muscles of the eye, the surgeon is never sure of not seeing procidentia of the eye result; and this takes place, above all, in those cases in which the section of the recti muscles has been practised, for the action of the oblique muscle becoming then predominant, the eye is drawn forward. When, therefore, the degree of strabismus is feeble, the operation should never be practised; it is not the same, however, when it is very great, as it was in the present instance.

In performing this section of the internal rectus muscle, the right eye being closed, the eyelids of the left would be kept widely separated, by means of the instrument of M. Velpeau —a kind of forceps, whose two blades, terminated by blunt hooks, are held apart by means of a spring. This instrument, called a telephareirgon, enables the operator to dispense with the assistant whose duty it is to separate the lids, and whose fingers interfere more or less with his movements. The eye being directed outward, the conjunctiva and aponeurosis covering the internal rectus muscle would be seized by a pair of forceps with very small teeth, not far from the caruncula lachrymalis, and the instrument then given to the assistant holding the head. These membranes would then be seized again by another pair of similar forceps, about one line from the others, and at the same level. With a pair of blunt-pointed curved scissors, the fold resulting from the traction exercised by these two instruments, and extending from one to the other, would be removed; and the fibro-cellular tissue underneath, still concealing the muscle, then pushed aside. As soon as the muscle would be exposed, a blunt hook would be passed under it from its upper edge, and one of the blades of the scissors being slipped alongside of it, the muscle would be divided. If the muscle has been properly seized, the operation is finished by a single act; but, most generally, a certain number of muscular fibres escape the action of the scissors, and then it will be found to be necessary to glide one of the blades of the instrument between the sclerotic and the sub-conjunctival aponeurosis, both above and below, in order to destroy all the adhesions.

The operation was performed exactly as has been described, nothing remarkable occurring at the time. A few days afterward, a diffused phlegmonous inflammation of the cellular tissue of the orbit developed itself; there were exorbitis, and tension of the tissues of the eyelid, with severe pain in the head. Not only were there fears for the safety of the eye, but even for the life of the patient. She was bled four times, leeches were repeatedly applied to the temples, and eight grains of calomel, in minute doses, were given every day; the eye itself was covered with a bladder containing ice and water, suspended from the framework of the bed. Under this treatment, in the course of a week the inflammation had entirely gone. Notwithstanding this success, which M. Nélaton attributed to the energy of his treatment, he said that the surgeon must not always expect to be so fortunate.

This patient left the wards with her appearance very much benefited by the operation. The diplopia with which she was then affected, M. Nélaton said, generally lasted about one year.[1]

Lachrymal Tumor and Fistula.

Lachrymal tumor and fistula constitute one and the same disease, taken at different periods of development; the lachrymal sac, increasing in volume, forms a tumor; the skin covering the sac, and the sac itself, ulcerating, a fistula results.

February, 1852. A man entered the hospital, sent there as afflicted with fistula lachrymalis. There was epiphora, and toward the internal angle of the eye, below the tendon of the orbicularis muscle was a tumefaction, accompanied with redness, and, besides, with œdema; about the middle of this tumefaction was a small ulcerated opening.

It was impossible, by means of pressure over this swelling, to cause a reflow of muco-pus through the lachrymal puncta; not the smallest drop at any time could be made to issue; and on this account M. Nélaton had some doubt as to the correctness of the diagnosis which had been made in the case. At first, it was thought that this might perhaps be owing to a tumefaction of the internal membrane of the ducts; but, in the course of a few days, as the abscess healed, it was very evident that it had no direct connection with the lachrymal apparatus.

M. Nélaton said that he had seen this several times; an abscess, by its situation, compresses the lachrymal canal for some time; an epiphora is the consequence, and it is supposed to be a lachrymal tumor. It is very important to make a correct diagnosis; and when the symptoms are not well marked, the surgeon should always wait, suspending his diagnosis.

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[1] In the winter of 1853, I heard M. Velpeau say that he found the operations for strabismus to succeed well in about one-half of the cases; and in the remainder, in one-half there was some amelioration, and in the other half the eye was the same or worse than before. As to the different methods, one, he said, succeeds about as well as another.

June, 1852. A young man, twenty-four years of age. Six years before, being already affected by a lachrymal tumor, he had consulted a physician, and he had introduced a canula into the nasal canal, after previously making an incision into the sac. For some time the patient thought himself cured; but at the expiration of two years, he was forced to return again to ask advice. The canal was found to be obstructed, and injections by means of Anel's syringe were made use of for a long time. This treatment was continued for two years, at which time M. Nélaton had first seen him. He extracted the canula, and introduced a seton into the sac and the nasal canal, enjoining on the patient the necessity of preserving it for a long time. He was unwilling, however, to do so, and the cure effected was but temporary. To effect a permanent cure, the seton must remain a very long time, at the very least, six months.

When this patient came to the hospital, M. Nélaton desired to make use again of the seton, but he would not hear of it; the *clou* of Scarpa was then proposed, but he objected to the metallic plate. He desired to have a canula, and one was introduced. M. Nélaton said, however, that, in the course of time, it would most certainly become obstructed, and he would be forced to have recourse to the seton.

In all cases in which it is possible to employ that method, M. Nélaton prefers graduated dilatation of the canal, by means of a seton.

Another case, in which I have seen him use the canula, was in that of a young woman, a servant, who could not have obtained a situation had the seton been made use of. She was in the wards in December, 1852. At the same time there was a patient in the male wards, upon whom he was on the point of operating by destroying the lachrymal passages by cauterization of the sac. The method, however, he said, was new, and after it had been made use of, there was nothing else to be done, for everything was destroyed; it was better, therefore, to employ simpler things first, and only to make use of it as a last resource. He therefore employed the seton, which must be allowed to remain at least six months. It is not very painful, and the patient becomes accustomed to it. M. Nélaton has never seen a patient who has not been completely cured by it.

The only other occasion in which the canula was made use of, was in the case of a man, fifty-five years of age, who was in the hospital in April, 1853. For seven years he had had lachrymation, and three months before his entrance, an abscess had opened near the inner angle of the eye.

Although he believes that it generally fails, M. Nélaton here made use of the canula; he did so because it is a very simple mode of treatment, and in two or three days the patient could go away cured. This temporary cure generally lasts for one or two years; sometimes, but very rarely, for five, ten, or fifteen. Some of those who return, at the expiration of one or two years, the canula having come away, are permanently cured. This, in connection with the age of the patient, was what induced M. Nélaton to use the canula.

February, 1853. A woman, who three years before had the first symptoms of her affection; after lasting for some time, an abscess opened, and this opening persisting, in the condition of a fistula, she went to the hospital, where a canula was introduced by M. Gosselyn, by which she was cured.

She had remained for about two years without suffering the slightest inconvenience, until five or six weeks before her return to the hospital, when, with tumefaction and redness, an abscess formed at the angle of the eye.

Below the direct tendon of the orbicularis muscle, in place of the usual fossette, was a swelling, and in it was an opening from which pus and mucus came when the tumor was pressed upon—above all, when the pressure was made upon the part above the tendon. There could be no doubt as to the diagnosis here—it was certainly lachrymal fistula.

Since the canula had been inserted, the patient had never known it to be displaced; by means of a small probe it could be felt to be still there. Sometimes in blowing the nose it is forced out.

In the treatment of this case, the clearing of the interior of the canula from the obstruction might be thought of; but this operation is not easily effected, and if it is done, it very soon becomes obstructed again. Any one who has seen tracheotomy performed, and has seen how easily a canula is obstructed, could have an idea of the condition of things in this case. On this account, M. Nélaton said he could not believe that the canula performs its function as a canal; it acts rather as a catheter left permanently in the urethra: at the expiration of a certain time the urine passes at the sides. The canula acts as a sort of permanent conductor. Scarpa, as every one knows, placed a leaden cylinder in the passage, and although it would seem to be blocked up by it, yet patients thus treated do not have epiphora; the tears pass alongside of the instrument.

In this case, therefore, there had been a canula acting as a permanent dilator for many years. It would be extracted, and, as he had seen on several occasions, upon the cessation of the inflammation, M. Nélaton thought a permanent cure would take place.

For the purpose of extracting the canula, the separating forceps of M. Lüer were made use of. The transverse striæ, or teeth, at the extremities of the blades which cross each other, are not upon the opposing surfaces, but upon the outside, as it were, so that when they are introduced closed, in appearance like a bent probe, into the opening in the canula, by pressing upon the instrument, the rough surfaces come in contact with the internal surface of the canula, which, being thus seized, can be withdrawn. In this case, it was extracted by M. Nélaton without any difficulty. The woman left the hospital immediately afterward.

As said before, M. Nélaton had hoped that, after the removal of the canula, this patient would find herself cured. She returned, however, two weeks afterward, to the hospital with a fistula. Beneath the tendon of the orbicularis muscle was a small tumor, from an orifice in which a small quantity of muco-pus was constantly issuing; through this opening a probe passed without the slightest difficulty into the nose. There was no denudation of the bones.

Here, M. Nélaton said, he was very much inclined to make use of cauterization. This method was used in the most ancient times; but the ancients considered lachrymal tumor to be but a simple, ordinary abscess. Fallopius was the first who discovered the lachrymal canal; Galen had seen the lachrymal puncta, but he imagined them to be orifices, through which glands poured a secretion of tears upon the surface of the eye. One century later, Maistre Jean, a Frenchman, first thought of the connection between the pathology of lachrymal fistula and the anatomical structure of that region. Some time after him, Anel used injections in the treatment of these cases, and cauterizations were abandoned, all the attention of surgeons being directed to the restoration of the natural passages. It is only of late years that the ancient method has been revived again, by Desmarres, Sichel, and others. In old times, the design of the surgeon in performing this cauterization, was to destroy carious bone, by which it was thought that the fistula was maintained; nowadays, however, it is done with the object of producing the obliteration of the lachrymal passages. That which the surgeon did formerly without being aware of it, he does at the present day from design.

In these cases of fistula lachrymalis, it should be remembered that there are two things, for which the surgeon operates; one is the overflowing of the tears, the other is the pathological condition of the lachrymal sac. It may happen that the canal is permeable, and yet its walls secrete pus.

M. Desmarres, who has paid great attention to this operation, takes most particular care not to cauterize the skin. He lays bare the sac by an incision, of quite considerable extent, four-fifths of an inch in length, commencing above the tendon of the orbicularis muscle, and dividing it and the skin in a direction from above downward, and from within outward. This being done, the two lips of the wound are separated; this is a delicate step of the operation; the section of the nasal arteries must be avoided as much as possible. The two flaps are held apart by two instruments, a kind of small rake invented for that purpose, and a compress is applied over the eye for its protection. The next step of the operation is the application of the cautery, and to do this well, there are some things with which the surgeon must be acquainted. The lachrymal sac is not globular, as might be supposed, but it extends backwards; there is an *arrière-cavité*, owing to its being bound down in front. The operator should always place himself upon the same side as the fistula, so that, on no account, he may turn the point of his instrument towards the eye. It is a good plan, also, to tampon the sac, after it has been opened for fifteen minutes, so as to apply the cautery to a dry surface.

It has been objected to this operation, that the lachrymal passages being obliterated, the tears must necessarily flow over the cheek. But many cases are recorded, in science, of their obliteration by accidents, without epiphora being the result; and the fact is, that epiphora shows itself very rarely after the cauterization. The eye, no longer irritated by the fistula in its neighborhood, the tears are secreted in less abundance; and it may be that the secretion is diminished by the destruction of these ducts. Moreover, M. Nélaton believes that a great portion of the lachrymal secretion always disappears by evaporation.

The operation was performed as described above. The next day an erysipelatous inflammation declared itself, which lasted for some days. Notwithstanding this complication, at the expiration of twelve days the wound was almost completely cicatrized; there was no pain, no swelling, and the patient said she was not annoyed by lachrymation; there was no evidence of epiphora. About ten days afterward she left the hospital, believing herself to be cured; and M. Nélaton said that he *thought* that she was; he evidently, however, had some doubts about it, and asked her to come back at once, if she had any return of the symptoms. He also called the attention of the class to the fact that, by pressing upon the upper lachrymal duct, some mucus issued from the puncture, showing that the obliteration was not complete.

This patient never returned to the hospital, so that, very probably, the cure was a permanent one.[1]

June, 1853. A man, a garde-forestier, about forty years of age. For several years, whenever exposed to the cold, he had been troubled by the weeping of his left eye; a month before, he had had an attack of erysipelas, extending over a great portion of the face, and since then the epiphora had been more troublesome than before.

Two or three lines below the tendon of the orbicularis muscle, there was a small elevation; the skin there was red, and upon pressure the tissues were felt to be firm, more so than they generally are in lachrymal tumor. This pressure caused a reflow of a muco-purulent liquid by the lachrymal ducts, but the quantity was not at all considerable.

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[1] The fact mentioned in the above case, of the flow of mucus from the puncture, is interesting; for Delpech, the celebrated surgeon of Montpellier, who frequently had recourse to obliteration of the lachrymal sac, says that the cases of cure are those in which the action of the caustics is limited to making disappear the inflammation of the lachrymal passages, without producing their obliteration, whilst the unsuccessful cases depend precisely upon the fact of the obliteration being complete.

This was not, properly speaking, a lachrymal tumor, but an affection impeding the passage of the tears; at a later period, it might become a lachrymal tumor; it was its first period, that of thickening of the membranes.

There was still a chance of cure, in this case, without an operation, and as the operations do not always cure, it would not be proper, under the existing circumstances, to employ one. When a collyrium of sulphate of copper was dropped into the eye, the patient afterwards tasted it in his mouth, showing that the passage into the nose was free.

This is the treatment that M. Nélaton thought best suited to the case; it would be long, but he thought it would be effectual. He preferred this mode of applying the solution to that by injecting it through the puncta, for the patient could thus make use of it ten or twelve times a day, and it would flow slowly through the passages; moreover, there would be no irritation of the ducts from the contact of a syringe.

July, 1853. A woman came into the hospital, who, for many months, had worn a seton, on account of an enormous dilatation of the lachrymal sac. The seton had been removed a month before; she no longer suffered from obstruction of the lachrymal passage, but something still remained. The permeability of the canal was re-established; no muco-pus could be pressed from the sac, but the threads had remained so long that a fistulous orifice was formed where they had been passed into the sac, and it would not heal; from this orifice the tears flowed, perfectly clear. This was all that remained of her old affection, but it embarrassed the patient.

In order to heal this fistula, M. Nélaton thought that it would be sufficient to cauterize it with a heated wire, and then to apply compression.

This compression was exerted by means of a serrefine, and, upon its removal, the orifice was found to be closed.

December, 1853. A young woman, a domestic, of feeble constitution. Three years before, she had epiphora of the right eye, and six months after this commenced, she labored under all the symptoms of an inflammation of the lachrymal sac. When pressure was made upon the swelling, she said that pus issued from the nose, but none ever came into the eye, and this is worthy of being remarked.

The study of the anatomy of the eye has been lately renewed, particularly by Béraud, and the valves of the lachrymal passages have been perfectly described by him.[1] The lachrymal ducts sometimes open separately into the sac, sometimes they unite and have but one common orifice; immediately below this orifice, there is a valve, mentioned by Huschke, which sometimes is circular, and embraces, thus, the common opening, representing a kind of diaphragm, pierced in its centre. Besides this valvule, which M. Béraud proposes to call the *superior valvule of the lachrymal sac*, there is another where the sac joins the nasal canal, and which, from its position, should be called the *inferior valvule of the lachrymal sac*. This valvule, the existence of which is not constant, and whose description is not found in any work upon anatomy, either ancient or modern, detaches itself from the external wall of the inferior part of the sac, and is directed obliquely upward, so that if prolonged, it would meet the inner wall at its upper part. M. Béraud believes that the formation of lachrymal tumor and fistula must be explained chiefly by this valvule, and that the treatment of this affection should be based upon an acquaintance with this anatomical arrangement.

In order to see this small valvular apparatus, the nasal canal should be opened by its internal face; when opened from the external and anterior part, as is always done, the valve is almost certainly incised.

In this case, M. Nélaton said the obstacle to the flow of the tears might be at the superior valve, for there seemed to be no difficulty, as said before, in the passage of the contents of the sac into the nose.

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[1] See the *Comptes Rendus* of the Biological Society, for 1851, page 55; also the same, for 1852, page 3. This occasion is also taken for stating that in the *Comptes Rendus* of the same society, for 1853, is a most excellent memoir, by M. Sappey, on the Glands of the Eyelids, which may be studied, with much profit, by those interested in the anatomy or the pathology of that part of the body.

For a long time this patient had been treated by injections, but they did not give satisfaction; then catheterism was tried, seven or eight times; then antiphlogistics; leeches were applied nine times; and lastly, the gradual dilatation of the sac, by means of a bougie placed there, was tried, and still she was not cured. At the internal angle of the eye was a hard, red swelling, with an opening in the centre. When a probe was passed into this, something hard and rough was felt, which was supposed to be an alteration of the bone.

This case, M. Nélaton thought a proper one for cauterization, and cauterization with the actual cautery, in order to destroy the sac, and, together with it, the denuded bone.

With the exception of the three cases above mentioned, where, for particular reasons, the canula was used, and of the two where, as a last resource, cauterization was employed, all the cases of lachrymal fistula that came into the hospital, and that were operated upon at all, were treated by the seton, or, to speak more correctly, by progressive dilatation of the sac by means of tents. This, of all the methods of treatment until now brought into notice, is that in which M. Nélaton has most confidence. But, one essential, even capital condition, in order to obtain a permanent cure, is to continue the use of the dilating body for a very long time; as a general rule, this time must be five or six months. It is only on this condition that it is possible to overcome the tendency to a new stricture.

The plan made use of by M. Nélaton, for the introduction of the tent, is more simple and less painful than those usually practised. A very fine catheter is introduced from above downward, into the nasal canal by the opening in the sac. This catheter either slips forward on the floor of the nasal fossa, and comes out of the nostril, so that a thread can be attached and drawn through the lachrymal passage by withdrawing the catheter again, or, as generally happens, the catheter slides backward, and makes its appearance in the back part of the mouth. In this latter case, a catheter, similar to the first, is introduced into the nostril of the same side, and made to project, also, in the back part of the mouth; the extremities of the two catheters are then easily fastened together, and the one last introduced being withdrawn through the nose, it brings with it the one passed through the lachrymal passage. All that remains to be done, is to fasten a thread, and draw it from below upward, as in the other, and more simple case, first described.

This thread, thus introduced, serves to conduct the dilating body, the tent. This is formed by doubling a thread a number of times upon itself, and it should be renewed every day, or every two days, being previously anointed with cerate, to facilitate its introduction. It is better to seek to produce a slow and gradual dilatation of the sac, than a dilatation too sudden, and which, for that very reason, would very probably be but temporary.

To be properly fixed, it is not necessary that the tent be very deeply placed in the lachrymal sac; so that the inferior third be filled, it is quite sufficient. When the tent is thus placed in the nasal canal, the lower end of the thread is cut off at the nostril, and pushed backward; it can easily be made to come out at each dressing by a sudden expiration; or, under any circumstances, it is easy to withdraw it by means of an ordinary pair of forceps. The upper end of the thread, rolled upon itself, is fastened upon the forehead, or upon the temple, by a small piece of court-plaster. It is very easy to replace the thread, so soon as it threatens to become too short, by attaching another to one of its ends by a knot, and drawing it through the sac.

Tumor of the Orbit (*Syphilitic*).

December, 1852. A woman, forty years of age, with a tumor of the orbit; it was situated upon the left side, and toward the temporal region.

Five months before, she had begun to suffer. She noticed, first, that it pained her when she opened her mouth; the pain was in the left temporal region, and that part began to be more projecting; and the masseteric region also. Resolutives were applied to these parts, and the swelling diminished, but, at the same time, a tumor appeared at the upper part of the external angle of the left eye. This tumor was very painful, and so small, that, when it was shown to a physician, he was, at first, unable to find it.

At the time she came to the hospital, the woman could open her mouth very easily; in the temporal region, it was œdematous, with deep-seated puffiness (*empâtement*); in the eyelid, at that part occupied by the lachrymal gland, was a tumor, the size of a small hazel-nut, quite firm, and yet, when pressed upon, it yielded to pressure, or gave that sensation to the fingers. It was difficult to say where this tumor was developed; and the first question was, whether it might not be osseous. But this was answered by its mobility; it was extremely movable, and, therefore, could not have had its origin in the bone or in the periosteum. However, it should be well understood that, if chance would have it so, it could be a pediculated tumor; but, in making a diagnosis, the surgeon should proceed with simplicity, and not make a multitude of suppositions. It would not be surprising if the tumor were in the lachrymal gland, that portion of it contained in the upper lid, and yet it was doubtful, for, in the first place, tumors there are very rare, and, in the second place, they are said to be lumpy (*bosselées*); here the tumor was perfectly globular; and, again, it did not have the hardness of scirrhus. Moreover, scirrhous tumors are excessively painful, and here the pains were not so very violent, nor were they of the same kind.

Again, the tumor might have been a cyst; and this M. Nélaton said he believed it to be. Its origin in the muscle was at once excluded, for the eye obeyed every movement, and the tumor remained motionless. There are other tumors, but there was no danger of confounding them with this one, for there was no pulsation, nor any coloration of the parts; and, besides, they are accompanied by a whole series of symptoms which did not exist here. A tumor can proceed from the interior of the cranium; and several times, M. Nelaton said, it had seemed to him that such might be the case here; but how could it force its way through the bones, and become as movable as this one was? Again, the patient had commenced to suffer in the maxillary region; and it might possibly be that there was a direct connection between the inflammation there and the tumor of the orbit; supposing an abscess to have formed under the temporal muscle, there might have been difficulty in its finding its way out, and it could have found issue by the fissure; but, in that case, it would have had a greater tendency to enter the lower eyelid.

As a last supposition, the tumor might be a syphilitic tumor, developed in the cellular tissue of the orbit; and, in that case, all the symptoms could be explained perfectly. There could, at all events, be no harm in trying the effect of iodide of potassium for a few days.

This antisyphilitic was given, at first, in doses of fifteen grains, afterward, of forty-five; and frictions of mercurial ointment were made over the seat of the affection. For eight or ten days, the treatment seemed to be without effect; but at the expiration of that time, the tumor was evidently diminishing in size, and in two weeks it had entirely disappeared.

Tumor of the Orbit (Melanotic).

January, 1853. A man, forty years of age, with the appearance of good health, by occupation a mechanic.

About eighteen years before, while playing with his child, the little girl, being behind him, threw her arms around his head, and, in so doing, struck his right eye with her hand. He went at once to the Hôtel Dieu, and entered the wards of Dupuytren; leeches were applied to the temples, and a general antiphlogistic treatment was instituted. He remained there for fifteen days, and, when he left, the inflammatory symptoms had departed, but from that time, or rather from the moment he received the blow in the eye, his sight in it was gone; he never saw afterwards. His daily occupation was one in which it was constantly necessary to use but one eye at a time, and thus it was very certain that he had been able to see before.

Three months afterward, the eye became inflamed again, and he underwent the same treatment; this time in the wards of M. Sanson. He was benefited as before, but his affection returned. This time, going again to M. Sanson, he was treated with extraordinary energy; a vein was opened at the same time in each of the four extremities, and the blood was allowed to flow until he fainted; afterwards leeches and cups were applied, until he was excoriated from head to foot. This treatment was practised on account of excessive pain in the head. He left the hospital relieved. He afterwards went to M. Lisfranc, where also the treatment was antiphlogistic; and, in addition, some punctures were made into some black projections, that commenced to appear upon the globe of the eye. He presented himself, in the next place, to M. Sichel, who extirpated the globe of the eye; by this, he was relieved of his pains. After the operation, he continued well until a few months before his entrance to the hospital, when he perceived a small tumor at the external part of the orbitary cavity; he did not see it, but he felt it by the touch, through the eyelid; by degrees it became larger, and very dark. It was punctured by M. Sichel, and some black matter and blood came away.

After this history, M. Nélaton said he doubted if the true cause of the affection was the wound made by the child's hand; the sudden loss of the eye, and the disease, being one showing a diathesis of the system, were at variance with such belief.

At the external part of the orbit of the right eye, covered by the upper lid, which was fallen and adherent, and upon which could be seen the mark of the puncture of M. Sichel, was a rounded tumor, extending to within half an inch of the internal commissure. This tumor was adherent to the external portion of the orbit, and extended backward toward the excavation for the lachrymal gland. There was no great pain, at that time, in the tumor, but, nevertheless, it was best to excise it, for it was a melanotic tumor, and of all tumors, they are those having the greatest tendency to return. M. Nélaton was very much surprised that, in this case, eight years had elapsed before the relapse had taken place. The place where this tumor was showing itself was not so very extraordinary; most generally, it has its birth in the ball of the eye itself. In many cases, in which he had operated himself, M. Nélaton had seen a return of the disease before one year had elapsed, and, at the autopsy, he had found melanotic matter almost everywhere in the body. Abandoned to itself, it is always fatal; in this case, the whole orbit would soon be filled; it was necessary to extirpate the mass—there could be no hesitation about it.

As regards the extirpation, in some cases it is a very simple operation; but here it was not so, for the surgeon must expect to find the eye filled with a cicatricial fibrous tissue. If anything useful were to be done, it was necessary to go deeply into the orbit, and every one knows that after the extirpation of the eye, the orbit always diminishes in size.

In this case, after the first operation, a hemorrhage had taken place, that had lasted for fifteen days, and it was possible that the same thing would occur the second time. The great difficulty of the operation, however, would be the adherence of the tumor to the fibrous tissue.

The tumor, when removed, was seen to be a black semi-gelatinous mass, enveloped in a cyst. M. Nélaton showed it to the class as a type of a melanotic cancer. The wound healed up without anything remarkable, and the patient soon left the wards. M. Nélaton said he feared very much that there would be a return of the disease, but the patient did not come again to the hospital, at least before the spring of 1854.

Foreign Body in the Orbit.

June, 1853. A young man, thirty years of age, who, three years before, had received a blow from the handle of an umbrella, at the inferior and internal part of the orbit of the left eye. He fell upon the ground, senseless, and continued so for half an hour, when he became aware of what had happened. At the part where the blow had been received, he found a wound, oblique, and corresponding exactly to the edge of the orbit at that spot. The extent of the wound it was impossible to judge, with exactness, when he entered the hospital, for several openings had been made, which had left cicatrices.

A violent inflammation had succeeded, which was treated energetically by the physician who attended him, by local and general antiphlogistics. The inflammation ceased, and the patient no longer suffered in the eye, but there remained certain alterations, about to be described.

The eyelids of the left eye were widely open, and there was a slight degree of exorbitis of the ball; there was external strabismus; the eye was drawn outward, and could not be turned in the opposite direction; it was impossible for the patient to move it toward the nose beyond the median line. All the other movements of the eye were perfectly preserved. As an organ of vision, it could scarcely distinguish light from darkness. Below the internal angle of the eye was a deep groove, corresponding to the wound formerly made there; its depth was at least two-fifths of an inch, and in the groove a small opening was found, into which, when a probe was passed, it came in contact with a body, hard and immovable. This depression corresponded to a point placed a little externally to the lachrymal passages, which is an important fact to notice.

This patient was sent to the hospital as affected with lachrymal fistula, but evidently there had been a mistake in the diagnosis; the sac contained no purulent mucus, there was no *pocket*, and no pus came from the puncta when pressure was made; the passage was permeable, for pure liquid tears flowed into the nose. In the bottom of the depression there was a clear liquid, resembling tears, as if they had come from the fistulous opening, but after wiping it perfectly dry, none came from it; the liquid was found to come from the surface of the eye, following the groove, and not from the lachrymal sac through the fistula.

There was no lachrymal fistula here, but there was a fistula in the neighborhood of the sac, and the question was upon what the persistence of this fistula depended. In M. Nélaton's opinion, it was owing to an alteration of the bone.

Before proceeding further, however, it is proper to speak of several operations performed upon the patient by M. Desmarres. From the first moment of the infliction of the wound, he had found, by means of the probe, the hard body, before mentioned as existing there. Thinking it to be a foreign body, he cut down upon it, and tried forcibly to pull it away, but without success. A second operation was afterward performed by him, with the same result. On the last occasion, the small bits brought away in the teeth of the forceps were examined under the microscope, and found to be bone. The first operation of M. Desmarres was performed six months after the accident, and the second eighteen months later. Foreign bodies, however, are very often found in cases similar to the present.

This young man had been struck by a hard body, on a spot where the bone is angular, and the soft parts are very thin. There had been *attrition* of the soft parts, and this had been followed by inflammation, which had lasted for a long time. Was there a sequestrum, and was the bone already necrosed, and loose? One of three things, M. Nélaton said, must exist in this case; the bone might be dead, and yet so inclosed by the parts around, that its elimination could not take place; again, as he has often seen, and in places where the bone is exposed to view, for instance, in the cranium, the bone, white as when macerated, or black as it sometimes is when exposed, may yet remain fast, why, he did not know; but, most undoubtedly, a bone can be dead, and yet no work of elimination take place; or, the bone might be simply denuded, and no adhesion take place with the neighboring parts. Which of the three was existing here, M. Nélaton said he did not know, but he could feel a naked bone, and it was altogether probable, that it was this that was keeping up the fistulous orifice.

There was nothing to be gained by temporization; an operation would be performed, and the sequestrum removed, or the exposed bone cut away. The incision made would be quite large, so as not to be embarrassed. The operation would be more difficult than might be supposed, for in all operations upon the eyelids the hemorrhage is annoying; by sponging, however, little by little, this diminishes. The lips of the incision would be held apart by two small instruments, shaped like small rakes, and then, if a loose sequestrum were found, it would be pulled away; if not, the bone would be cut and removed by a strong knife. In regard to the after-dressing, it was a question whether union by first intention should be attempted. Though strongly tempted to try it, M. Nélaton thought he should not allow himself to be influenced by indications depending upon a little more or less of cicatrix; it was best to heal the wound slowly, and then he could watch, and if any small pieces of bone were left, he could remove them.

In performing the operation, a probe was introduced into the fistula, and then a bistoury was introduced alongside, so as slightly to enlarge it; a probe-pointed bistoury was then used, in order to extend the incision on either side as far as was deemed necessary. When the hemorrhage had somewhat ceased, a strong pair of forceps were applied to a hard bony mass, seen in the bottom of the incision, and by a violent effort of traction, to the astonishment of every one, an umbrella handle was brought away. The students declared it to be *magnifique, delicieux.* It should be stated that M. Nélaton had been very particular in his inquiries, and the patient always persisted that he had seen the handle of the umbrella after the blow. Certainly, another umbrella had been shown him. This handle was cylindrical, slightly conical, two-fifths of an inch in diameter at the thickest part, and one and four-fifths inches in length.

The next day M. Nélaton again spoke of the case, as an example of the persistence the surgeon must have in interrogating a patient. He had multiplied his questions in every way, in order to have most positive information about this case; the shape of the handle he had seen after the blow, whether there had been a plate with a name upon it, &c. &c. He had done so, because he could not help supposing that a foreign body was there; it was with much difficulty that he had brought himself to renounce that supposition.

After the operation, a bladder, containing ice, was applied over the part, and no inflammation followed it. The same evening, the patient complained of losing blood, and from the right side of the nose. Upon examination, the blood was found to come from that side; upon the left side, where the operation had been performed, the mucus was untinged. He said he was not subject to epistaxis, and it was difficult to explain this.

Forty-eight hours afterward, the eye had receded somewhat, the eyelids were less open, and the eye could be turned further inward than the median line. Both the projection and the strabismus, M. Nélaton believed, would completely disappear. This strabismus, when the existence of a foreign body had not been known, it had been difficult to account for; it was difficult to believe in the rupture of a muscle, for it would have left effects behind it, that did not here exist; and as to its being caused by a paralysis of the nerve, the other muscles supplied by the third pair retained all their powers of movement.

The fistulous orifice healed, and the strabismus, and the projection of the globe, entirely disappeared before the patient left the wards. In March, 1854, he returned again to the hospital, to see if nothing could be done for the slight deformity, caused by the small depression, still existing near the inner angle of the eye. M. Nélaton advised him to defer the operation, and return again in several months, should he still desire it. He was scarcely able to see with that eye.

CHAPTER XIII.

AFFECTIONS OF THE NOSE.

Polypi of the Nose.

POLYPUS is the name given to tumors of very different natures, that can be developed on all the mucous membranes, but which are most frequently observed in the nasal fossæ, the uterus, or the vagina. This name is also given to some tumors produced underneath the mucous membranes in the submucous cellular tissue. They only differ from other tumors by becoming more narrow at the base, so as to have a sort of pedicle. By taking the shape of the tumor as the basis of a pathological classification, results full of confusion have been caused, and morbid products, most different from each other, have been brought together. Under the same heading as polypi of the nose, are here brought together in accordance with this, the usual classification, tumors formed of the same element as the cellular tissue; of the elements of the glands contained in the Schneiderian membrane; and of the elements of cancer.

The analogy of structure and of disease that exists between the pituitary and the uterine mucous membrane is worthy of being noticed. It is the more worthy of notice, that in this double relation a great difference is found between different portions of the mucous system: the lingual mucous membrane, for instance, is very different from that of the pharynx and of the œsophagus; the mucous membrane of the œsophagus differs greatly from that of the stomach; the mucous membrane of the stomach differs from that of the small intestine; that of the small intestine from that of the large, &c.

The anatomical and pathological similarities between the mucous membranes of the nose and of the uterus are owing chiefly to the predominance in both of them of their glandular elements. It is on account of the size and number of their glands that the great vascularity of these membranes must be explained.

To this analogy of structure must be attached the not less remarkable analogy in the diseases of these two membranes: both, in fact, are the source of hemorrhages, one of a periodical and monthly hemorrhage, the other of an accidental hemorrhage, often also periodical, but most generally reproducing itself at unequal intervals. In both of them polypi and fibrous tumors are produced, and there they are most usually found. Both are frequently affected by cancer, and every one knows the predilection that cancer has for the glandular organs.

Mucous Polypus of the Nose.

April, 1854. The first case of the ordinary mucous polypus of the nasal fossæ, that I had yet seen in the wards, entered the hospital. There was in this instance a deviation of the septum, that might readily deceive the surgeon, for behind it was a true tumor, a polypus. For the cure of this affection, M. Nélaton employed what he considered the only good and suitable method of treating mucous or vesicular polypi, namely, *abruption*, tearing them away. This was done with a pair of stout forceps, and the patient left the wards.

Tumefaction resembling Polypus of the Nose.

July, 1853. A young woman asked advice for an affection of the nose. In each nostril was a globular, rounded, almost transparent mass, smooth, soft to the touch, not bleeding, and completely filling the nostril. The passage of air was very difficult—it was almost entirely cut off; the voice was nasal, and the mouth dry, for the patient was obliged to breathe all the time by the mouth. She had been already treated by astringent powders and injections.

These small tumors are generally taken for polypi, but they are not so; they are constituted by the tumefied, thickened mucous membrane, covering the inferior turbinated bone. The diagnosis is very easy; there is a tumor on each side, exactly the same; very rarely is there but one; and, again, it is inserted just where the bone is, which is easily determined by passing a probe between the tumor and the septum, and trying to do the same thing outside. After this trial, there can be no doubt about the affection.

This disease is very obstinate; in addition to the astringent applications, this patient had once been cauterized; this sometimes modifies the membrane sufficiently to keep it from swelling, but in this case it did not answer. M. Nélaton said he had seen abruption performed in similar cases, but by it you cannot do what you want; it is a brutal operation in such cases. He preferred to excise a portion of the turbinated bone, which he would do with the scissors; this bone can generally be cut by the ordinary scissors contained in a pocket-case. The parts rapidly healed, and the patient left the wards cured.

Cancerous Affection resembling Polypus Nasi.

February, 1852. A man, thirty-six years of age, by profession a groom. His health was habitually good; in his family, he knew of no one who had been similarly affected. Two years before, he first perceived the affection for which he entered the wards. It was directly after a very severe attack of illness, which, from the symptoms he described, was very probably typhoid fever, that he noticed a small tumor just inside of the nostril. He went to an apothecary, who gave him a wash, that had no effect upon it; he then consulted a physician, who found a tumor in the nose, and he removed it by tearing it away. The tumor returned, and was again removed; after a time, its abruption had to be performed almost every month; and at last it became so large as almost to fill the whole cavity of the nose. Finally, after one of these operations, the parts were seized with erysipelas, after which attack, he said, the tumor under the lower jaw first made its appearance.

When he came into the hospital, there was some deformity of the face, the wing of the nose on the left side being pushed forward and outward. The nostril was filled by a tumor, softish, torn by the slightest scratch, and bleeding upon the most trifling occasions. Some of the small detached pieces being placed under the microscope, were found to be full of the characteristic elements of cancer. In order to determine the extent of the tumor, it was explored by introducing *two* fingers, which is necessary in order to have a clear impression, into the mouth, one finger in each fossa. The tumor extended from the nostril as far as the posterior opening, and was certainly implanted upon the nasal wing of the left side. Moreover, the patient said that in all the extirpations that were made, the tumor was found to adhere to the external and anterior part of the nasal fossa.

The osseous arch of the palate was hard, unyielding upon pressure, showing that the bone was healthy; there was no loosening of the teeth; the eye looked natural, and there was nothing to indicate any compression of the brain; as to the nasal fossa of the opposite side, there was a slight difficulty in inspiration, but it did not amount to anything. Underneath the lower jaw was the tumor, which the patient said had followed the attack of erysipelas; it was evidently a gland, and, M. Nélaton feared, a gland already degenerated. In spite of this complication, however, he thought it his duty to undertake an operation to save the patient. Such an operation would be long and painful; all the external incisions should be made while the patient was under the influence of chloroform, but when the deeper parts were reached, it would not answer to have the patient insensible, on account of the blood falling into the mouth.

An incision was made in the median line of the face, from the root of the nose directly to the mouth; this flap was then turned to the side, and the deeply seated tissues operated upon; the osseous roof of the palate was so healthy, and the teeth so firm, that it was decided to leave the external half of the upper maxillary bone. The disease, however, was found to propagate itself toward the pterygoid processes, the sphenoidal sinus, &c.; and, although the red-hot iron was applied to these parts so as to thoroughly cauterize them, M. Nélaton said he was not satisfied that he had removed the whole disease.

In July of the same year, the patient came again into the wards with a return of the affection. M. Nélaton said he thought it best to do nothing in the case, a very serious determination to come to, but one he considered entirely justifiable. The first time he had seen the patient, he did not know that the affection extended so far as it did, and he had operated under the impression that the conditions were not so unfavorable as they afterward proved to be. But this time, having a more correct knowledge of the state of affairs, it was his duty to make the man avoid a dangerous operation, and one most certain to be followed again by a relapse. The patient, therefore, did not remain in the wards.

February, 1853. A man, in the prime of life, entered to receive advice for an affection of the left side of the nose. The patient said that for a long time he had been subject to colds in the head; about fifteen months before, he had been attacked with epistaxis, and afterward the left nostril became obstructed. He consulted a surgeon, who told him he had a polypus, which he tore away, and afterward the nostril became free. Shortly after, the same obstruction existed, and the same operation was again performed. The obstruction recurring, he went to the Hôtel-Dieu, where only simple washes were applied; it was the best thing there was to do, but the patient was not satisfied, and left. He then came to M. Nélaton.

The man's face had lost its symmetry, the left side projecting forward more than the right; the nostril of that side was dilated and rounded; even the superior part, where it is osseous, was pushed outward; the eyeball was projected forward and thrown toward the exterior part of the orbit, in the internal portion of which was another tumor, superposed, as it were, on the other. The canine fossa was projecting. In the interior of the mouth there was nothing remarkable. In the interior of the nostril was a red mass, bleeding with facility, one part of which was very hard, the other very soft; the same thing is true of the tumor in the orbit. The movements of the eye could still be executed, but they were limited. Through the velum palati the existence of a tumor could be detected, but the finger could not be introduced sufficiently far to touch it through the posterior nares. The patient could not respire at all through the nose, it was only by the mouth. His sufferings were not great; in these cases the patients suffer very much at first, the suborbital nerve being compressed; but at last the pains cease.

This tumor was cancerous; in the first place it had the appearance, hard and soft together, of encephaloid tissue developed in the bones; moreover, the integuments, whose condition it is always necessary to notice, were vascular, thinned, and of a violet hue; and its growth had been most rapid, the nose, almost the whole of the maxillary bone, and a great part of the orbit, were known to be already invaded. There could be no doubt whatever as to the diagnosis; the great point in question was the treatment. Was an operation to be performed or not? If the patient were left to himself, this is what would happen; the external integuments would become thinner and thinner, and the same thing would take place in the mouth. The deeply-seated portions of the tumor would become ulcerated, as well as the superficial; and, from the purulent discharge, the patient would be attacked with putrid infection. All this would take place in six or eight months, and then the patient would die. Nevertheless, with this certainty before him, N. Nélaton said he was unwilling to operate upon the patient. The operation, though a frightful one, is not very dangerous, and it was not the danger that deterred him; he would not operate, because he was sure that he would be unable to remove the whole disease; there are always inaccessible prolongations, and the ablation is always incomplete. The tumor occupied the bottom of the orbit, and there the sphenoidal opening exists, into which there were certainly prolongations, and these the surgeon could not reach. If an operation were performed, it would be necessary to tell the patient fairly the true state of his case, and that a return was certain; and M. Nélaton thought it better to leave him in ignorance of his condition, and, by keeping up his hopes, render him as comfortable as possible. The man did not remain in the hospital more than a few days.

March, 1853. An old man, sixty-eight years of age, was sent into the wards as affected with fibrous polypus of the nose. Upon hearing his age, M. Nélaton said, at once, it was not that affection; he did not know of a single example of it in the adult; it commences when the patient is young, and is so promptly fatal, that it is never seen in old persons.

As it was thought to be very necessary to the patient's comfort that he should remain ignorant of the true nature of his affection, no questions as to its being hereditary, &c., of a nature to awaken his suspicions, were insisted upon.

About twelve months before, the patient had commenced to take notice of his affection; at that time, when he spit, after drawing the air through the nares, he noticed some blood would come, and, after a short time, it commenced to flow from the nostrils. He went to a physician, who told him he had a polypus, and tried to extract it.

When he came into the wards, a kind of continual oozing of blood from the affected nostril was first observed; there was no deformity; inside of the left nostril was a tumor, brown, ulcerated on its surface, soft, bleeding at the slightest touch, and by the finger small pieces could be detached. As to its posterior limits, the roof of the mouth was not depressed; when the finger was passed behind the velum palati, a mass, seeming to occupy both nares, lumpy and softish, was found. The patient said it gave him pain. As it could do no harm, some small pieces were taken away by the forceps, and examined under the microscope; it was found to be evidently encephaloid tissue.

This was a disease which would surely bring about a speedy and terrible death. All the neighboring parts would become attacked; the mouth would be filled with a sanious discharge; the odor would be most fetid, and the patient would die of putrid infection. In such a case, the surgeon should operate if there were any chance of success; but M. Nélaton did not think there was the slightest, for he thought that prolongations of the disease existed, not to be reached by surgical means. It was a disease before which it was best for the surgeon to recognize his inability to do anything. Why torture the patient by a terrible operation (for the administration of chloroform was out of the question), when a return was certain? Sometimes after breaking up the surface of such tumors the hemorrhage is less, and this was the only operation to be thought of here. After this had been done, the patient left.

Fibrous Polypus of the Nose.

January, 1853. A young man, twenty years of age, and very stout and healthy in his appearance. He said that when he was young he was very subject to colds in the head. In December, 1851, he commenced to experience an alteration of the voice, and some difficulty in respiration; for this he was treated by internal medicaments; the iodide of potassium was one, and a solution of alum had also been used as an injection into the nostril. Two months afterward, the physician attending him recognized the existence of a polypus, and tried to tear it away. This was done every Sunday and Thursday for three months, making in all twenty-four attempts, and the pulling was very energetic. All being unsuccessful, the patient came to Paris, and in July entered the wards of M. Velpeau, at La Charité; in September, the abruption of the polypus was attempted, and in the following month two operations were made in one week—one by abruption, the other by excision. By these operations he gained something, particularly in the right side, but he lost it all again, and came into M. Nélaton's wards as bad as he ever had been.

In looking at the patient, the right side of the face was seen to be more voluminous than the left; and there was also on that side a slight degree of projection of the eyeball. When the patient was placed in a strong light, a smooth body was to be seen, situated three or four centimetres, or about one and a half inches, from the nostril on the right side; the left side of the nose was also completely stopped up. When the mouth was opened, a very usual symptom at once struck you—the projection forward of the velum palati; the osseous portion of the roof of the mouth was also deformed—it was slightly convex. With a small pair of forceps the velum was raised up, and behind it a polypus could be seen; the part there visible was about as large as a pigeon's egg. It was necessary to seek where this body was inserted; the finger being passed directly behind the soft palate, it was found that there was only simple contact between the two. It was more difficult to explore behind the mass; it was necessary to be very quick, but M. Nélaton said that, in spite of some doubt, it seemed to him that the tumor had its insertion into the anterior part of the vertebral column. A fresh preparation, of an antero-posterior section of the head and neck through the median line, was shown the class, in order to point out how near the tubercle of the atlas is to the soft palate. It was upon the anterior part of the atlas, therefore, that the tumor was thought to be fastened. (It will be seen in the relation of some subsequent cases, that M. Nélaton was mistaken on this point, and clearly shows himself to have been in error.) Between the posterior nares and the vertebræ is a portion of the basilar process and of the sphenoidal bone, and experience has shown that it is almost always there that fibrous polypi originate. As was shown upon the preparation, the periosteum, the fibrous membrane covering the bone, is in that part naturally very thick. Fears have been entertained, but not justly, however, of carrying the actual cautery to this place, for fear of the propagation of the caloric to the brain; but still, from the physiological condition of parts, it is not safe to judge of the pathological, and by the pressure of a polypus, the walls of the sphenoidal sinus could be placed much nearer to each other than they were in the healthy preparation.

It was necessary to know if this tumor sent any prolongations into the neighboring parts. At the superior part of the pharynx there is a kind of infundibulum, and there the tumor has a tendency to go, for it goes where there is least resistance; experience shows that these tumors have a tendency to be propagated into the zygomatic fossa. The Eustachian tube offers a way all open to them. In this patient, externally, at the edge of the mastoid process was a small tumor; it was situated directly under the zygomatic process. On first finding this, it gave M. Nélaton great anxiety, but examining it more closely, it seemed more soft and movable than the polypus would be; and, moreover, when the masseter was strongly contracted, it could still be readily felt; it was not then covered by the muscle; the small tumor was but a lymphatic ganglion, and others were found in the neighborhood. There was then no reason for admitting the development of the polypus into the zygomatic fossa. There is another way open to the passage of these tumors, the spheno-palatine foramen, and this would not be believed possible, did not experience show it to be true. These tumors are propagated into the sphenoidal cells; also into the maxillary sinus, and when this takes place, it can generally be determined by the deformity, for the walls of the sinus are easily displaced. In this case, there did not seem to be any deformity of the sinus, the defect of symmetry of the two sides of the face was to be sought for in the soft parts; by measuring with the fingers the thickness of the cheeks, the difference was very perceptible. There were no prolongations then into the osseous cavities of the face.

What was to be done in this case; and, first, was there anything to be done? Twenty-four different attempts had been made to pull it away; and abruption, when employed twenty-four times, means also crushing. After that, excision had been performed, and by M. Velpeau, which is saying everything; it was as well done as possible. Was, therefore, this young man to be allowed to go without anything being done for him? M. Nélaton did not think so. The tumor would descend still more into the pharynx; there would be ulceration, and the purulent, fetid discharge would fall into the stomach, and the patient would die of slow putrid infection; or he might die of difficulty of respiration, or of hemorrhage.

When the operation is performed in these cases, one of three things may happen: some die of the operation, some get well, and others have a relapse. Death is rare from the operation; cure is still more rare; relapse is the most usual. In this case, M. Nélaton said he would try to make one step further than had already been done here. These tumors *form one*, so to speak, with the periosteum, and it is easy to understand how difficult it must be to get rid of them, when it is necessary to attack them by such roundabout ways. The fibres of these bodies are implanted perpendicularly to the surface of the bone, forming one body with its fibrous portion. They are very different from the fibrous bodies of the uterus; there the fibres are rolled around one another, and the polypus can be enucleated. When a ligature is applied to an ordinary polypus, the root dies also; but, in these fibrous polypi, it does not, and repullulation after the ligature, or after excision, is the rule. If a fibrous layer is left at the base of the brain, a relapse is certain; it is necessary either to take away the osseous portion, or to destroy, by every possible means, the roots of the polypus. Sometimes the osseous portion can be removed. At the commencement of his practice, M. Nélaton said he remembered to have excised a portion of the vomer, upon which the polypus was planted. The insertion was above, just where the vomer joins the base of the brain; the vomer was first divided below the tumor, and then one pull was sufficient to pull away the whole affair.

Some time ago, toward the close of the year 1848, a young man went to M. Marotte, complaining only of epistaxis; M. Marotte thought that there was a polypus of the nose. Another surgeon, who saw him, said he had nothing but a simple deviation of the septum, but, going afterward to M. Nélaton, he found the soft palate projected forward, and other signs of fibrous polypus of the base of the skull; he ascertained it to be implanted at the basilar process, near the petrous portion of the temporal bone, at the sphenoid, and continuing forward, at almost the whole internal face of the pterygoid process. M. Flobert had already practised an operation that threw some light upon the subject; he took away the superior maxillary bone, and was thus enabled to remove the whole polypus and a great part of its roots. He was so happy as to cure his patient. Soon afterward, a surgeon of Lyons did the same, but the details of the case were not published. M. Nélaton was acquainted with these facts, but he was not decided to practise the removal of the maxilla; he thought it better to excise the roof of the mouth, a very simple operation. M. Manne, of Avignon, was the first to have the idea of dividing the velum palati, in order to get at these polypi. M. Nélaton was aware of this plan, and determined to go still further. He cut the membrane, hard as leather, covering the roof of the mouth, firmly down to the bone, in the median line; an incision was then made anteriorly, from one side of the mouth to the other, meeting the other, so as to form a T-shaped incision; with a spatula this membrane was then detached from the bone on each side; this detachment is easily performed. There are some difficulties, however, in turning the membrane aside, posteriorly, and this is the cause of it: the velum palati is formed of two membranes, one palatine, the other nasal; it is then easy to understand that when you try to drag it aside, no matter how thoroughly it has been detached in the mouth, it still adheres by the posterior layer. This posterior layer of the velum must be cut by a pair of curved scissors. The soft parts being thus turned to the sides, with a small perforator, two holes were made in front, one on the right, the other on the left; a blade of Liston's forceps was then inserted into each hole, and the bone was cut. The bony roof of the mouth was broken to pieces, and thus a large opening was made by which to extract the polypus, the whole of which was then excised; the operation, however, was by no means considered as completed.

The next day, the whole of the uvula was found united from top to bottom; the parts were separated again; the following day they had again reunited, and were again separated; they remained afterward without uniting. The patient had an attack of pericarditis, which prevented a continuation of the treatment for some time, but when he recovered, the roots of the tumor were scraped away, and Vienna paste applied. All this, as may readily be believed, was not the affair of a week's time, but of two or three months. When all was thought to be destroyed, the patient was still kept several months longer in the wards, and at the expiration of that time, there being no symptom of a return of the affection, staphyloraphy was performed, and the palate reunited. M. Nélaton had seen this patient but a day or two before; the opening in the roof of the mouth had a diameter of two millimetres, or one line, laterally, and six or seven, or three lines, antero-posteriorly. When this resection of the roof of the mouth is practised, the periosteum below is left, and the Schneiderian membrane, the periosteum for the nose, is generally left also; these two membranes being placed in contact, the bone is regenerated.

Since this operation, other surgeons have operated several times, but they have always preferred the removal of the upper maxilla. When, however, the insertion of the polypus is toward the base of the cranium, it is better to perform the operation just described. When the superior maxillary bone is removed, the pterygoid processes are still left, and there, at the posterior orifice of the nares, the parts are narrowest; it is impossible thus to see so well the base of the cranium, as by the other method. Moreover, when the upper maxilla is removed, the polypus is taken away, and then the parts are closed; but this simple ablation of the tumor is but the first part of the operation. There is a vast difference between the two operations, in many respects; the mutilation by the one is far greater than by the other; besides the mutilation of the face, there is the removal of an arcade of teeth; the removal of the polypus itself is more difficult, and, besides, the after-work of cauterization is not performed at all. You cannot, with security, with certitude, destroy one of these polypi by the removal of the upper maxillary bone.

M. Nélaton performed his operation upon the dead subject before the class, after his lecture. The uvula was seized with the forceps and divided by curved scissors, the membrane covering the roof of the mouth was then divided by a strong scalpel, cutting hard upon the bone, as you cut paper upon a table; the lateral sections at the anterior extremity of this division were made in the same manner, and then a spatula was used to separate the flaps from the bone. The nasal membrane was next divided. Two holes were then made in the bone, at the outward extremities of the anterior lateral sections, and the bone was cut by Liston's forceps, and the pieces pulled away by the dressing forceps. By means of the curved scissors, the opening was then enlarged as much as was deemed advisable.

This operation was then performed upon the young man then in the wards. It is simple in itself, but appears to be exceedingly laborious. The patient was seated in a chair, and examined and inquired the purpose of every instrument that was made use of, without making any complaint. In this case, the bone forming the roof of the mouth had been in great measure absorbed, and when the resisting fibrous membrane was forcibly divided, the bone itself was split by the knife; it was, therefore, unnecessary to resect it, as above detailed; but after making the T-shaped incision, the two sides were opened like folding doors. The extent of the surface of implantation of the tumor was, at least, four centimetres in diameter. It is easy to understand that it would be impossible to tear away such a tumor by forceps. There was no hemorrhage during the operation, and it had been feared that there would be, for sometimes these polypi have many vessels ramifying through them: in some that M. Nelaton had seen, they had a diameter of two millimetres, or one line. All that was desired was performed: the greater portion of the mass was removed, about a quarter of an inch in thickness being left, and what remained was in full view. In a few days, M. Nelaton said, he would proceed with the fragmentation, the tearing to pieces of what remained: when he could proceed no further in that way, he would have recourse to cauterization. A caustic that does not vaporize would be used, in the dread of its entering the air-passages; Vienna paste would answer very well, or the electric cautery, which has not the inconvenience of becoming cold.

During eighteen days, rugination was practised by means of various instruments, upon the remainder of the polypus, the surface of which was five centimetres in length, and three in breadth. At the expiration of that time, cauterization, by means of the electrical apparatus, was had recourse to. Ten days afterward, it was cauterized by means of mono-hydric nitric acid; the small platina wire of the electric cautery not destroying fast enough; it was too slow a method. The acid was used for a long time; at each application being left in contact with the part, four, five, or six minutes. On account of the stifling vapors of this acid, so irritating to the air-passages, the cotton dipped in it was pushed through glass tubes, whose section was more or less oblique, according to the surfaces against which it was to be applied. One inconvenience must also be attended to in this operation, that the ball of cotton does not fill the tube, for if it does, the vapor cannot escape at the sides as you push it with the glass rod, and it is driven into the throat. These applications demanded the greatest patience, both of the surgeon and of the patient; they were constantly made use of until the end of June, when but a very small portion, about the size of the end of the thumb, was left. As this nipple-shaped lump was being destroyed, the projection of the eye was much diminished; M. Nélaton thought it to be a prolongation of the polypus into the zygomatic fossa, through the hole of the ganglion of Meckel. In the course of another month, the patient left the ward cured of his polypus.

In this case, M. Nélaton did not perform staphyloraphy; the voice of the patient was hoarse, but he spoke very distinctly; the patient said, moreover, that his voice had always a strange timbre. In the first operation he had performed, five or six years before, he had performed staphyloraphy, but he had been struck by the fact that, although the opening left afterward was very small, the change in the voice was still immense. He does not believe that the operation can remedy the alteration in the voice.

Before the patient left the wards, M. Nelaton said that in the great majority of cases, if not in all, the polypi do not have their insertion into the vertebral column. A case of polypus has been reported, as having been removed, where the insertion extended down to the fourth cervical vertebra inclusively; upon a preparation of those parts it was shown that a line drawn directly back from the base of the tongue strikes the second vertebra, and that the fourth vertebra is directly back of the larynx.

A polypus of this kind is, so to speak, a vegetating periosteum. It is an affection necessarily fatal, if no operation be performed.

From the fact of its always being seen in young men, two conclusions may be drawn, that it begins in youth, and kills before old age.

February, 1854. A man, thirty-one years of age, in a most miserable, weakly condition, entered for a polypus of the base of the cranium. He had all his life worked, as a day laborer, in the country. In answer to questions, put for the purpose of seeing if the development of his affection had been preceded by any symptoms, he said that after the age of ten or eleven years, he was subject to epistaxis, so frequent, that two or three times a day he was forced to make use of cold keys down the back, &c., in order to check it; in consequence of this, he became very anæmic. A few years before his entrance, it diminished, the bleeding only coming on every eight or ten days. The patient himself attributed the tumor to a fall he had had two years before; it was clearly not so, but he had not a doubt about it himself. He said he had had, at that time, a fall upon his head, and since then the symptoms he then labored under commenced to show themselves. Eight months after this fall, or sixteen before his entrance, he consulted a physician, who found a polypus in the nose. He tried to pull it away, and energetically, for the patient said he pulled one way, and the physician the other.

When this patient came into the wards, there was evidently a polypus within the nasal fossa; the deformity of the face was very great, the right half of the nose was very much larger than the other, the swelling extending from the root of the nose to the lip; it seemed also as if the eye of that side was a little too projecting, but the difference between the two was very slight. There was a small tumor alongside, resulting from the compression of the lachrymal passages. Inside of the right nostril, very near to the orifice, was a body, of a deep violet hue, with small ulcerations on the surface. This body was free on all sides; it was evidently the prolongation of a tumor that had its origin deeply in, for the finger could be moved all around; there was only simple contact of parts, and no fusion of tissue. The skeleton of the nose was modified; in the middle of the right nasal bone was a groove, commencing at the frontal bone, where the bony tissue had entirely disappeared. Inside of the mouth, at the anterior portion, was a tumor filling the space between the teeth, rosy, ulcerated here and there, and disposed to bleed with great facility. This surface was composed of two portions, one bleeding, as was said, the other not, and differing moreover in their appearance; the portion not bleeding was seen at once to be constituted by the membrane of the palate. The tumor had worked its way through the roof of the mouth, and through this opening the finger could be passed into the nares. The velum palati formed a relief upon the mass; it was but slightly removed from the anterior arcade, and extremely convex forward; the uvula could not be seen without some search. This condition of the soft palate was owing to the existence of a tumor situated behind it, for a hard body, not yielding to pressure, was felt there, and going beyond it, a body was encountered, bleeding at the slightest touch. There was not the slightest doubt, therefore, that there was a tumor in the left nasal fossa, that had pierced the roof of the mouth, and descended into the pharynx.

Such a tumor could be but a cancer or a fibrous polypus, and it was thought to be the latter, on account of the age of the patient, and principally on account of its consistence. The tumor bled with facility, but that does not mean that it was not consistent; on the contrary, it was very firm, while cancerous affections of the nose are so soft, so friable, that the finger enters them without feeling resistance. This being settled, what are the consequences of such a disease? Read the cases reported of this affection, and almost all will be found to be of young persons; this patient was the oldest M. Nélaton had ever seen. Two consequences must be drawn from this: that the disease develops itself in young persons, and, again, that they do not reach adult age. Some cases of the disease will be found reported, it is true, of older persons, but there is good reason to doubt the real nature of the affection. Among those reported by M. Michaud (of Louvain), there is one where one thing took place that is of itself sufficient to show that there was an error in the diagnosis. After its excision, the tumor returned, and another similar tumor appeared in the cervical region. Now, in fibrous tumors, there is repullulation on the spot, but not *à distance*. This case, the report says, occurred in a person forty-two years of age. It was not to be believed to have been a fibrous tumor.

Most of the patients die of repeated hemorrhages and of slow asphyxia. In this case, the man breathed with the greatest difficulty, the air only passing by two small holes at the sides of the tongue. He could not swallow the smallest particle of solid food; he declared it was impossible for him to do it; he could scarcely swallow liquids. Besides this, they become ulcerated on the surface, and the sanious pus falls necessarily into the alimentary passages; when this patient was approached, his breath was perceived to be most fetid. In some very rare cases, the tumor can extend to the brain, and cause death by cerebral symptoms.

The patients are doomed to die if nothing be done; the surgeon must operate. There is a choice to make in every operation, one for each particular case; every case cannot have exactly the same method applied. For instance, if the pedicle be very small, abruption might answer, or the ligature; if the base be large, you could not pull it away, for you cannot by forceps pull a hemisphere from its surface of implantation. Again, the tumor may be single or multiple; or it may have branches going in different directions. Examining through the nose, it is impossible to go very deep with the finger, and you cannot obtain much information as to the place of implantation, but under the velum palati two fingers can be passed into the pharynx and curved upward. The origin of the tumor could thus be felt in this case, but M. Nélaton said he could not say precisely to what spot he had reached, and that it was altogether impossible for him to tell precisely the anatomical implantation of the tumor; he knew it was high up, and that was all.

The insertion of these polypi is not very well known, and M. Nélaton believes that most of the cases reported are erroneous upon this point. In several, the tumor is said to have been implanted into the base of the cranium and then downward as far as the fourth vertebra. A preparation, made by dividing by an antero-posterior section the head and neck into two equal parts, was again shown, in order to point out the relation of parts in this region. The part of the vertebral column felt at the bottom of the mouth was seen to be the tubercle of the atlas, or the odontoid process; now, surgeons generally think that they touch parts much lower, when they carry their fingers there. For his part, M. Nélaton believes that these tumors are *never* inserted, *never*, on a cervical vertebra; he believes that they *never* have their origin lower than the basilar process. A tumor arising from the bone, as it advances, must raise up the mucous membrane covering the parts; and these tumors, as they go further and further downward, raise up the mucous membrane as they descend between the muscles and that membrane. It is this disposition that had led surgeons into error, and, among others, M. Michaud, who has written one of the best works upon the subject. The anterior surface of the basilar process, the anterior surface of the sphenoid, the neighboring portions of the petrous bone, and those of the pterygoid process, these are the only parts in which anatomy shows these tumors to be really implanted. M. Nélaton said he would be found perhaps in contradiction with what he had taught before, for in a case that had been in the wards a year previously, he had considered the tumor to have its origin from the base of the basilar process, and from the tubercle of the atlas; at that time, however, he had not sufficiently seen and reflected upon these cases.

These polypi send branches, where they meet with least resistance, into the nasal fossæ, also into the zygomatic fossæ, through the foramina, that appear very small, but the bone can be absorbed, as the palate bone was seen to be in this instance; and also into the maxillary sinus.

In the treatment of this case, abruption was not applicable, nor was the ligature. It is well to know that the ligature is dangerous; M. Nélaton has seen a good number die in the hands of Dupuytren, he believes, of putrid infection. It is a tumor slowly destroyed, whose detritus is constantly falling into the alimentary canal. It is of their ablation that surgeons think nowadays. For this, a new way was opened, in 1840, by M. Flobert, of Rouen, who took away the upper maxillary bone. M. Michaud, who repeated the operation more often, did the same thing. It was repeated in Paris, also, by Robert and Maisonneuve, but M. Nélaton said he must avow that he never had been pleased by this operation; even if it could have been done without inflicting the frightful deformity, he would not have done it. Toward the close of the year 1847, the idea occurred to him of opening a way to get at these tumors, through the mouth. M. Manne, of Avignon, had formerly advised the division of the uvula, in order to

CHAPTER XIV.

AFFECTIONS OF UPPER AND LOWER MAXILLARY BONES, ETC.

Tumor of the Upper Maxillary Bone.

NOVEMBER, 1852. A young man, twenty years of age, stoutly built, and whose health had always been excellent. His affection—a tumor, occupying the right superior maxilla—commenced five or six years before. Soon after its appearance, he went to St. Louis, presenting, so the surgeon said, into whose wards he had gone, a tumor in the roof of the mouth; hard throughout almost its entire extent. It had a peculiarity; after pressing upon it for some time, it yielded, and there was a sensation of cracking; this sensation could be produced several times, and then it ceased to be perceptible. The tumor was thought by some to be a liquid tumor, developed in the sinus, and by others, to be solid. The row of teeth on the affected side was intact. M. Nélaton was invited to remove the part. He made a transverse incision, about an inch in length, from the commissure of the lips, which he thinks best, for none of the ramifications of the facial nerve are divided; the anterior wall of the sinus, thus exposed, was removed by means of an ordinary scalpel, and then the tumor was enucleated, as it were, with much facility. The tumor was perfectly circumscribed, and resembled a fibrous tumor, only rather more hard. It was thought that the boy would get permanently well, but he was again presenting himself with an affection of the sinus.

Upon examining the patient, an exterior tumefaction upon the right side was seen; all the integuments were healthy and movable, and there was no enlargement of the veins. The swelling extended from the mouth to the eye, prolonging itself, particularly toward the ascending process of the upper maxillary; the orbital edge of that bone was distinctly felt; its external account of the great dyspnœa of the patient, great difficulty was had in pulling it down in order to cut it away. There was very little blood lost at the time of the operation or afterward. The third day of the operation there was a great deal of gangrene, and it would certainly produce the symptoms of putrid infection, if something were not done. Monohydric nitric acid was therefore applied, with the same precautions heretofore described; this produces an eschar, but one that does not diffuse that gangrenous odor that comes from a part dead from the action of the economy. The most nourishing diet was given to the patient. The fourth day he was exceedingly prostrate; there was great danger of death from putrid infection. On the eighth day he died. Before the operation, there were eschars and ulcerations on the tumors, and already some symptoms of putrid infection; most unfavorable circumstances, and to them, in a great measure, the patient's death was to be attributed. The patient had always complained of sharp pain in the head, and his right pupil was much larger than the left, and immovable. Was there pressure on the third pair? Even if a part of the tumor had worked its way into the cavity of the skull, that would be no reason for not performing the operation.

At the *post-mortem* examination, the head and neck were cut in half, by an antero-posterior section, leaving the septum narium on one side. When the cranium was opened, and the dura mater removed at the point of passage of the optic nerves, it was seen at once that a portion of the polypus had entered the sphenoidal fossa, and had insinuated itself alongside of the optic nerve. In this patient, as there had been still conservation of vision, compression of the third pair had been thought to exist, rather than of the optic; this, however, would be further inquired into. As to the point of implantation of the polypus, it was upon the anterior face of the basilar process, toward the sphenoid bone; and only on the basilar process. The insertion was confounded with the periosteum. There was a prolongation of the polypus into the sphenoidal sinus, which was enormously dilated; by the section which had been practised, the sinus had been cut in two, and nothing could be easier than the separation of the polypus. It was *born* from the basilar process, and sent prolongations into cavities, but without taking any origin from them. This is very important, for, in order to destroy such a tumor, all you have to do is to cut but one point. There was one point worthy of being noticed, the polypus was adherent to the septum of the nose by bridles of soft tissue. Now, there is a capital distinction between such *bridles* and *origins;* such adhesions are what might be called consecutive. Suppose the tumor enters the posterior nares, the circulation is impeded, and gangrene results in several places; when these parts are eliminated, you have suppurating surfaces. The same thing takes place on the side of the part pressed upon, and the two parts, covered with granulations, can unite. These adhesions are the result of agglutination, they are not origins; the adhesion is membranous, not periosteal.

A most thorough examination was again made of the preparation afterward, but, contrary to what was thought, the third pair of nerves was altogether intact. The point of insertion of the polypus was quite high up on the basilar process, and also at the base of the pterygoid process of the right side; there was none into the petrous portion of the temporal bone.

March, 1854. Another operation was performed for fibrous polypus of the base of the brain, or naso-pharyngian polypus, in which only the details, particularly applicable to the case, will be given.

The patient was a young man, nineteen years of age, a fact supporting what has been said, that it is an affection of youth. One year before, he perceived it for the first time; the left nostril was stopped up. As at that time the tumor was necessarily of some size, you must descend still more the ladder of his age to come to the origin. At the expiration of three months more, the right nostril was stopped up. It went on and on, the symptoms proceeding to the posterior fauces. Nine months before his entrance, there had been a hemorrhage of two platefuls of blood, and soon after, without any appreciable cause, another one, of one; since then there had been no hemorrhage, but a constant oozing of blood. For some time past he had always had a bad taste in the mouth; he had no appetite, and had become very thin. He had already consulted a physician, who found a polypus, and tried to pull it away, without any success. Another physician had no better success; he also had introduced a stick of nitrate of silver into the nostril, but, as might be supposed, it was altogether powerless before such an affection. M. Nélaton said he would not be deterred by his recent failure, but would again perform the operation which has already been discussed. Unless the tumor were operated upon, the patient would certainly die, and two perfectly successful cases in his hands, show that the affection can thus be entirely cured. He still prefers his own operation to the other, of the removal of the upper maxillary bone. As to the danger, it is not more dangerous than the other, for certainly the removal of the small thin bone of the palate is insignificant; and, in his method, the preparatory operation is limited to that, and the turning aside of a small portion of membrane. As a traumatic lesion, there is no comparison as to the preparatory operation. As to the excision of the polypus, it is about the same thing, but afterward there remains a great advantage: when his plan is followed, the way to the polypus is left open; while, by the other, the parts being closed, there remains but a very small hole at the anterior part of the mouth, through which the surgeon can scarcely see, and as to passing his instrument, it is impossible. Now, it should be remembered that every excision is but a preparatory operation, one enabling you to put your cauteries and your instruments in contact with the roots of the disease. Without this, the relapse is certain; there are depressions in the bone, and it is impossible to excise closely the polypus there.

In this patient, the roof of the mouth was very concave and very narrow. From what could be found, the polypus was thought to be inserted into the lower portion of the basilary process. It was unknown, whether or no it entered the sphenoidal sinus, but there were no signs to indicate it in the organs of sense. In order to get at this polypus, the osseous and soft portions of the palate would be removed; the velum palati would be completely divided, for, indeed, in such an operation, the surgeon must not embarrass himself with the idea of reuniting it more easily, by leaving a portion of the uvula intact. The knife used in making these incisions is almost all handle; the blade is very short and very strong.

In his last lecture on this subject, the idea was emitted, that when the way had thus been opened, the parts would be left, and the polypus destroyed in totality by cauterization. This would employ a great length of time, five or six months, and had it been proposed to this patient, he would at once have gone away. It would, perhaps, be the surest, the least dangerous method, to open the way, and then destroy the whole tumor by actual cautery and by cauterizations. The young man on whom the operation had been performed a year before, in the wards, was still very well; and also the other young man, operated upon seven years before. This one was a hatter, employed by Cibus, the celebrated hatter in the rue Vivienne, and readily showed what had been left after the operation; the hole in the palate was then so small that a quill could not be made to enter it. In this case, a large portion of the polypus would be excised, and the rest afterward destroyed by cauterization.

A very large portion was removed at the operation; but four days afterward, what was left had so swollen that it seemed as large as ever; the portion projecting was removed by the knife. The patient was then attacked by otitis, from propagation of inflammation into the Eustachian tube; this, however, was to be expected. When the inflammation of the ear was better, the portion of the tumor in the nose was pushed into the mouth, and then excised. When all that could be cut away had been excised, M. Nélaton said he would commence the cauterizations.

I do not know how this case terminated. I believe he refused to remain in the wards.

Tumor at the Root of the Nose.

April, 1853. A child, about four years of age, came into the hospital on account of a tumor situated just at the root of the nose. The tumor was noticed when the child was born, and when he was twelve months old, was already very apparent. It had been shown to a surgeon, a short time before he came to the hospital, when an incision had been made into it, but, probably from the want of sufficient assistance, he had not succeeded in removing it.

The tumor was the size of a hazel-nut, and exceedingly firm; it adhered to the integuments by means of the cicatrix left by the incision made into it, and could not be moved upon the deeply-seated parts. M. Nélaton thought it to be a fibrous tumor, developed in a situation where they are rarely seen. It concavity was forced outward. The shape of the nose was unchanged, as also the position of the eye. Inside of the mouth was a swelling, occupying the part behind the canine tooth; it extended back the distance of three teeth, and did not quite reach the median line of the roof. All that portion of the roof of the mouth was depressed; the teeth were all healthy.

The diagnosis of the affection was not difficult; it was a reproduction of the old disease.

The liquid tumors found in the maxillary sinus may come from an inflammation of the lining membrane, caused, in some instances, by a bad tooth; but these abscesses have a first period —a painful one. A celebrated surgeon of Paris, who has written some works especially upon affections of the maxillary sinus, once cut out a maxillary bone, thinking the affection a cancer, when it was only an abscess. Dropsy of the sinus[1] is hardly ever attended with pain; it becomes dilated; the walls are distended and thinned, and at last are perforated somewhere; so that the liquid is only separated from the exterior by the soft parts. The tumor, in this patient's case, showed this absence of the bony parts; but it was dense, firm, and not fluctuating.

If this affection were allowed to go on, the development of the mass would become such as to even threaten life. The deformity alone is, of itself, an important matter for so young a person. The eye would be pushed out, the nose obstructed, first one side and then the other, and the roof of the mouth would be pushed down, so that eating, and, at last, respiration, would be impeded. It was necessary, therefore, to operate; and the whole osseous shell, the whole upper maxillary bone, must be taken away. M. Gensoul, who is the inventor of the operation, made his flap by cutting alongside of the nose, from the angle of the eye to the upper lip at the level of the eye-tooth, then horizontally to near the lobe of the ear, and then again upward, parallel to the first. After him, M. Velpeau has modified the operation, making but one incision from the angle of the lip upward and outward. Lisfranc also modified the operation; but all of them have the

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[1] *Dropsy of the sinus* is a bad name for the affection, for it seems to indicate a collection of serosity; it is an accumulation of the liquid secreted by the mucous membrane by which the cavity is lined. In these cases, the bones yielding where they are thinnest, the tumor makes its appearance in the canine fossa in the cheek.

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AFFECTIONS OF UPPER AND LOWER MAXILLARY BONES, ETC.

Tumor of the Upper Maxillary Bone.

NOVEMBER, 1852. A young man, twenty years of age, stoutly built, and whose health had always been excellent. His affection—a tumor, occupying the right superior maxilla—commenced five or six years before. Soon after its appearance, he went to St. Louis, presenting, so the surgeon said, into whose wards he had gone, a tumor in the roof of the mouth; hard throughout almost its entire extent. It had a peculiarity; after pressing upon it for some time, it yielded, and there was a sensation of cracking; this sensation could be produced several times, and then it ceased to be perceptible. The tumor was thought by some to be a liquid tumor, developed in the sinus, and by others, to be solid. The row of teeth on the affected side was intact. M. Nélaton was invited to remove the part. He made a transverse incision, about an inch in length, from the commissure of the lips, which he thinks best, for none of the ramifications of the facial nerve are divided; the anterior wall of the sinus, thus exposed, was removed by means of an ordinary scalpel, and then the tumor was enucleated, as it were, with much facility. The tumor was perfectly circumscribed, and resembled a fibrous tumor, only rather more hard. It was thought that the boy would get permanently well, but he was again presenting himself with an affection of the sinus.

Upon examining the patient, an exterior tumefaction upon the right side was seen; all the integuments were healthy and movable, and there was no enlargement of the veins. The swelling extended from the mouth to the eye, prolonging itself, particularly toward the ascending process of the upper maxillary; the orbital edge of that bone was distinctly felt; its external concavity was forced outward. The shape of the nose was unchanged, as also the position of the eye. Inside of the mouth was a swelling, occupying the part behind the canine tooth; it extended back the distance of three teeth, and did not quite reach the median line of the roof. All that portion of the roof of the mouth was depressed; the teeth were all healthy.

The diagnosis of the affection was not difficult; it was a reproduction of the old disease.

The liquid tumors found in the maxillary sinus may come from an inflammation of the lining membrane, caused, in some instances, by a bad tooth; but these abscesses have a first period —a painful one. A celebrated surgeon of Paris, who has written some works especially upon affections of the maxillary sinus, once cut out a maxillary bone, thinking the affection a cancer, when it was only an abscess. Dropsy of the sinus[1] is hardly ever attended with pain; it becomes dilated; the walls are distended and thinned, and at last are perforated somewhere; so that the liquid is only separated from the exterior by the soft parts. The tumor, in this patient's case, showed this absence of the bony parts; but it was dense, firm, and not fluctuating.

If this affection were allowed to go on, the development of the mass would become such as to even threaten life. The deformity alone is, of itself, an important matter for so young a person. The eye would be pushed out, the nose obstructed, first one side and then the other, and the roof of the mouth would be pushed down, so that eating, and, at last, respiration, would be impeded. It was necessary, therefore, to operate; and the whole osseous shell, the whole upper maxillary bone, must be taken away. M. Gensoul, who is the inventor of the operation, made his flap by cutting alongside of the nose, from the angle of the eye to the upper lip at the level of the eye-tooth, then horizontally to near the lobe of the ear, and then again upward, parallel to the first. After him, M. Velpeau has modified the operation, making but one incision from the angle of the lip upward and outward. Lisfranc also modified the operation; but all of them have the inconvenience of dividing the branches of the facial nerve, and thereby producing paralysis. In place of making these external incisions, it has been thought that the bone could be removed by the aid of an incision, cutting through the centre of the lip, and going up through the nose, and then in turning the flap aside, to take care to scrape the bone; by this proceeding, the muscles will not be divided, and these nerves will remain intact. There are some difficulties in doing this, above all when the tumor has a great external development; but if there be not sufficient space, a horizontal incision, meeting the other at its superior extremity, could be made. It remained to decide whether the floor of the orbit should be removed in this case; and it was thought to be requisite, as the patient had been operated upon before, and the disease had returned. The danger would not be increased by its removal; and for the deformity, it would, in the end, amount to the same thing. The two incisive teeth of the affected side would be left, with the portion of bone into which they are inserted; the canine would be extracted at the commencement of the operation. For the bones, they would be perforated with an instrument like that used for cutting holes in leather, and then a chain-saw would be introduced. As to the floor of the orbit, that portion of the bones is covered with a periosteum, that adheres to it very slightly; this would be left, for it is very easy to separate. The suborbital nerve should be fairly divided before the bone is forced out of its situation, for without that it is very painful, and even dangerous.

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[1] *Dropsy of the sinus* is a bad name for the affection, for it seems to indicate a collection of serosity; it is an accumulation of the liquid secreted by the mucous membrane by which the cavity is lined. In these cases, the bones yielding where they are thinnest, the tumor makes its appearance in the canine fossa in the cheek.

M. Nélaton made his incision through the wing of the nose and the centre of the lip, as has been described, and the soft parts were then turned aside, carefully scraping the bone. The saw was applied directly in the alveolus of the extracted canine tooth; the ascending process was divided by Liston's forceps; the chain-saw not being used at all. The periosteum of the floor of the orbit was separated from the bone, and the nerve divided at the distance of one centimetre from its anterior edge. When he wished to make the bone *basculer*, in order to disarticulate it at its posterior portion, it was found to be difficult to push it downward, for, desiring to preserve the two incisive teeth, the section of the bone had not been made directly straight.

No bad symptom followed the operation; in the course of the day, the patient vomited some blood, but this is what most generally happens; the following day, his pulse was scarcely more frequent than natural, and there was no heat of the skin. The day after the operation, the needles used in the hare-lip sutures for the purpose of keeping the edges of the wound in contact, were removed. This might be considered premature, M. Nélaton observed; but you should rid a wound, as soon as possible, from every foreign body. The wound had already completely united; there was not a trace of the incision at the angle of the eye.

The body contained in the sinus was, like the one previously removed, fibrous; and, when cut, M. Nélaton said the section resembled that of a turnip. The adhesion of the tumor was extremely strong, particularly at the alveolar arcade. Cruveilhier thought it to be the same as the gingival tissue.

M. Nélaton said that he had removed the upper maxillary, about fifteen days before, and something quite curious had occurred, that might be rendered useful. The operation was completed without opening the nasal fossa; the membrane of Schneider remained intact; it was separated, and its exterior surface, thus laid bare, had become inflamed and much thickened.

This operation for the removal of the upper maxilla is a very advantageous one, and experience shows it not to be dangerous. After some time, there is a kind of fibrous skeleton, supplying the place of the bone.

February, 1853. A woman, about to be operated upon for an affection of the upper maxillary. She was about thirty-five years of age; she had never had syphilis. About ten years before, she commenced to suffer in the mouth, very far back on the roof, and you could still see the marks of small abscesses that had formed there. At two points the bone was bare, and there was a projection outward at that portion of the roof; the whole of this altered portion had a diameter of about one inch. When a probe was introduced and moved upon the bone in that situation, it was felt to be too hard; it is a sensation not to be explained by words, but every one knows that he does not feel the same sensation upon touching a tooth, as a bone; it is harder. When asked if she had had all her teeth, in order to see if one was retarded, the patient was unable to say, but thought she had had them all. Even admitting it, it could very well happen that a root was left, and that an exostosis arose from it; or it could happen that an exostosis had come of itself, an ivory exostosis, and then the bone had become necrosed. This M. Nélaton said he had seen, and the patient sometimes gets well in this way. In this case, he thought there was an exostosis necrosed to a certain extent.

The disease was not seen to extend itself in the deeply-seated parts of the face; the patient said the nostril was affected, and if it were from the tumor, it must have been from a prolongation, which would render the operation far more difficult. In necrosis, the periosteum is always very thick, enormously so, but this thickness will disappear when the cause is removed. In case this tumor extended very far, there would be a great deal of trouble, for this ivory tissue cannot be cut; it would have to be left exposed to the air, in order to determine the necrosis of the exposed portion.

In the operation, an antero-posterior incision was made in the gingival tissue, and from each extremity an incision was made, extending to the median line of the mouth; the flap was then separated from the hard parts, and the hard necrosed bone was excised. By this removal of bone, the maxillary sinus was opened, and it was found to be filled by a tumor whose tissue was very soft. This tissue was pulled away by means of a curette; it was fungous, vascular, and under the microscope found to be constituted of epithelial cells. The fact that the disease had lasted ten years, was almost sufficient of itself to say that it was not cancer; a soft vascular cancer progresses with rapidity. Often cancers of the bone march with the greatest rapidity. The affection was thought to be a necrosis that had caused a chronic inflammation in the neighboring parts. The cause of the inflammation had been now removed, and some nitrate of silver would be introduced to change the action of the membrane; or, should that not prove sufficient, Vienna paste. The sinus was frequently and carefully washed out, in order to guard against putrid affection. When the patient left, there was a small fistula remaining, which did not, however, annoy her much.

January, 1854. A stout, fine-looking man, about forty years of age. Three years before, he had intense pain in the upper great molar of the left side, so great that he pulled it himself; the tooth came away, and with it a portion of the upper jaw. Since that time, the patient found the parts not to be natural, there was a communication through them into the nasal cavity.

Upon examination, the second molar was found to be wanting, and, probing the perforation, you entered the maxillary sinus; the bicuspid and first molars were loose and altered, the third molar was perfect and very firm. Besides this, there was a deformity of the roof of the mouth, a deformity owing to tumefaction of its membrane. There was an obscure fluctuation, as if there was a liquid under it. A probe was pushed in different directions, without finding dead bone; there was no doubt, however, but that it existed. These abscesses, symptomatic of osseous alteration, are quite often met with; tumors developing themselves slowly, and, when opened, revealing necrosed bone. An incision would be made into the swelling, and if the dead bone were movable, it would at once be removed.

M. Nélaton cut directly through the soft parts, down upon the bone; the blood issued so freely that they were very long in stopping it, and when the hemorrhage was arrested, no more was done. The patient was left alone for two weeks, and there did not seem to be much inclination to meddle with him. The necrosed bone could then very easily be felt, but it is difficult to operate upon these cases in the interior of the mouth. It was necessary, however, to relieve the patient, for there would be a cause of continual suppuration, and the odor was horrible. There was a good deal of difficulty in performing the operation, from the loss of blood, and it was desired, also, not to injure the mouth more than was absolutely necessary. Forceps were introduced into the opening already existing in the maxillary sinus; the davier was also introduced, and a sequestrum was seized. Efforts were made to bring it out, but it was evidently too large for the opening; this was, therefore, slightly enlarged. In addition to the sequestrum, a tooth was also brought away, that had been contained in the sinus. It is well to know that the teeth of the upper jaw (and it is not extremely uncommon) do not always come out in the normal direction, and when they do not, the crown generally comes out in the sinus. At other times, the crown remains in the bone; it can go in every direction; M. Nélaton said he had even seen this extremely curious position, the roots of the second and third large molars were interlocked, the crowns being in directly opposite directions. This condition of things had brought about an abscess of the sinus, that had necessitated an operation. In these cases, very different accidents may occur; dropsy of the sinus, abscess, osteitis, and necrosis of the bone.

After the operation, the finger was passed into the sinus, and all was left in a good condition. The result of the operation evidently gratified M. Nélaton very much, for the arch of the palate had been preserved, and the hole in the alveoli would most probably close, or nearly so; if it did not, it would be very easy to fix a small apparatus so as to cover it. In operations for necrosis, the surgeon should not regard brilliancy; it looks badly to hunt in narrow orifices; it is much more showy to make long incisions; but he should not regard appearances, only the result.

The next day, the patient had vomiting and chills; this was thought to arise from a pharyngitis, for there was no sign of phlegmasia in the parts operated upon, at least, not of too much. There were no pains in any part of the body, to indicate purulent absorption, but it was very much feared; there was nothing, however, to indicate it, except an operation, and the subsequent chills. The patient had violent chills, for three days in succession, and at the same time there was nothing remarkable in the local condition of the wound. As they might possibly come from intermittent fever, quinine was given, first in twelve grain doses, and afterward in twenty. During the whole time, the lungs, the abdomen, the brain, &c., were carefully examined. On the sixth day of the operation, there was a commencement of jaundice, and pain in the right shoulder. Percussion did not show anything; the liver was not increased in size, nor was the hepatic region painful; this is an important point, for at the commencement of hepatitis, there is sometimes pain when there is, as yet, no increase of volume. Auscultation gave a sound like a crepitant râle, quite sharp, in a small circumscribed spot, behind, and at the base of the lung. The next day this râle no longer existed, but it was replaced by a souffle, heard over a very circumscribed point. There was thought to be pneumonia, with diaphragmatic pleurisy, and extension of the inflammation to the liver; it is not very uncommon to have this, in pneumonia of the right side, as can be seen by the researches of M. Bouillard. The pain in the right shoulder, in these cases, is generally explained by the diaphragmatic nerve, having its ramifications in the seat of the inflammation, and being painful in its course. The phrenic nerve, however, passes over the scalenus muscle, in front of it, and in this case this did not seem to be the most painful point; it was in the acromial region. By a singular chance, a man, who had had an abscess of the liver, and then a fistula, was in the wards at the same time, and he also indicated precisely the same point as the seat of pain. Were these two exceptions, or not?

It was feared that, in this patient, there was a general cause for these symptoms, that they were the results of purulent absorption. Two days afterward, on the eighth day of the operation, the upper and inner part of the left knee-joint was found upon examination to be painful, and without there being any signs of inflammation there; the cause of the pain was, most probably, a purulent collection in the way of formation. It must not be believed, however, that in these cases purulent collections are found without previous inflammation; the parts go through all the stages, before the formation of the pus. In addition to quinine, strong wine, and good diet, the tincture of aconite was given, in doses of thirty drops to commence with, and then of one drachm. M. Nélaton said, that he used to have some faith in this medicine in the treatment of purulent absorption; and that, both at St. Louis and St. Antoine, hospitals where he had previously had his wards, he was convinced he had seen good effects from it, but in his present wards he had never known it to do any good. The patient continued to have chills; his prostration was profound; the fever was not very intense, and the pulse was exceedingly feeble. There were evidences of purulent collections in the articulations of the feet, as well as of the knees. Twenty-four days after the operation, the patient died. His friends did not wish any examination of the body after death. This operation had been a simple one, and one generally attended with no bad results. The sequestrum was loose, and to extract it, it was sufficient to enlarge, very slightly, an opening previously existing, and yet the patient died.

Tumor of the Inferior Maxillary Bone.

February, 1852. A young boy, thirteen years of age, a little pale, but of quite a healthy appearance. Upon the lower jaw was a tumor, that had commenced two years and a half before; there was nothing in the phenomena that had already taken place to which attention was directed. The boy had all the teeth that he should have had; the wisdom tooth had not yet appeared; there was no caries; all were perfect. Between the bicuspid and the first molar teeth, there was a distance of two centimetres, or nearly one inch. In that position there was a tumefaction, the augmentation of volume being directed above all, toward the external face of the bone; the membrane covering it was exactly like the rest of the gingival tissue. One and a half centimetres below the alveolar line, was a relief, indicating the line of separation between the soft portion and the hard; for this tumor to the touch presented a very different density in different portions: in one place there was depression and raising up under the finger, and in another, inflexibility. At the junction of the soft and hard portions there was a sudden change; there was no gradual passage. The tumor was translucent.

In the diagnosis of this tumor, the idea of its being liquid was at once excluded. The tumor was fluctuating, but it could be recognized that the sensation came from the displacement of a solid tissue, and not of a fluid. A cataract needle was plunged into it, and moved here and there, but it was found to be everywhere in contact with solid substance. Sometimes cysts do develop themselves in bones, but this is their march; the bone forms a shell around it, which becomes very thin, and at last is absorbed; the cyst pushes the bone eccentrically, and determines at the same time its absorption. M. Nélaton said he had never seen scirrhus of the bones; he had seen encephaloid, colloid, and melanotic cancers of bones, but scirrhus in bones he said did not exist. There was no swelling of the ganglions, which takes place in scirrhus from the very first; there were no pains, and, besides, scirrhus is the cancer of old persons. He considered it to be a fibrous tumor, which has been well described as it exists in the maxillary bone; it is entirely the same as the fibrous tumors of the uterus. There are two varieties; the first do not contract adhesions with the osseous tissue, and are very easy to enucleate; the second, of which this was an example, is different, the fibres being implanted into the osseous infractuosities; the adherence of the osseous tissue to the fibrous is most intimate, just as in the vertebræ. The sensation of fluctuation in the tumor was produced by the movement of these fibres, being pushed backward and forward. Of course, in this case, enucleation of the tumor would be impossible, on account of the anatomical arrangement just pointed out; it would be necessary, in order to remove it, to practise the resection of the bone.

In performing the operation, in order to lay bare the bone, M. Nélaton said he would not make an incision from the commissure of the mouth; this produces a great loss of blood, and in this case he desired to give chloroform. The whole exterior face of the tumor would be exposed without entering the cavity of the mouth; and for the internal face he would saw; first, once through the bone; the two fragments would then be separated, which would be done without using too much force, for fear of producing a luxation, and then he would see what there was to do.

The operation was commenced by pulling out the two teeth, the canine and the bicuspid; the incision parallel to the lower border of the bone was then made, externally; the facial artery was immediately tied; the soft parts were then separated from the bone, which was removed by means of the chain-saw.

The tumor, after its removal, was found to be a mixture of fibrous tissue and of osseous tissue; a small thickness of the jaw still remained healthy; the dental nerve was pushed downward, lodged in its canal. "It was a fibro-plastic tumor, but inclining toward the fibrous," was M. Nélaton's expression. This tumor was solid and fluctuating, solid and transparent. The patient did not suffer after the operation, did not lose blood, and had scarcely any fever. In forty-eight hours, the wound appeared to have united, and the sutures were removed; it is a good plan to remove them as soon as possible. During the operation, the threads of the ligatures had been cut closely to the knots, which were thus abandoned in the wound. After this operation, the lower lip was pulled more toward the healthy side; this could be explained by a nervous lesion, the incision having divided some branches of the facial. The symphysis of the jaw was also slightly carried toward the uninjured side. These things, however, M. Nélaton said, would not continue, but when the cicatrix was completed, it would contract, as they always do, and draw the parts to their proper places.

Necrosis of the Inferior Maxilla.

November, 1851. A young boy, ten years of age, who gave the following information about his condition. Five months before, he had had a very serious attack of typhoid fever, toward the end of which a number of abscesses made their appearance, particularly about the face; three were very large, one on each cheek, and one under the lower jaw. These abscesses had healed up, but they left him with the impossibility of opening his mouth; only a very slight movement was permitted, not more than two millimetres. This was caused by the existence of cicatrices; on the right side, a large surface of the internal mucous membrane of the cheek adhered to that covering the bones; all was reunited and confounded in one mass. In both maxillaries, superior and inferior, of the right side, there was a small sequestrum; in the left side of the lower maxillary there was also another. When a sequestrum of dead bone is in contact with the mucous wall of the maxillary sinus, there is inflammation of that sinus, and also swelling of the lower eyelid. In this patient there was none, and it was thought that the sinus was healthy.

This case was interesting, M. Nélaton said, in a surgico-therapeutical point of view. He was of opinion that it was necessary first to remove these sequestra, and that afterward the neighboring parts would return to their normal condition. The pieces of dead bone were loose, and came away without difficulty. Five weeks afterward, the boy came back again; there was then no more dead bone, but in the greatest degree of separation he could give his jaws, the upper teeth still covered the lower. The strongest bridle appeared to be between the parts alongside of the canine teeth, and this was divided. The simple section of this part had a wonderful effect; the poor child was most delighted. He did not remain in the wards, and as the day succeeding the operation was the first day of the year, he probably commenced soon to enjoy the free motion of his jaws.

February, 1852. Another case of necrosis altogether similar to the one just related, in an adult; he had had typhoid fever, at the termination of which he had a diffused phlegmon of that side of the face, that had healed up, but leaving a sequestrum. When he entered, there were fistulous orifices, from which pus was discharged, and when a probe was introduced, the existence of a sequestrum was easily determined. This sequestrum was attached to a tooth, and it was removed by its extraction. After the dead bone had been removed, the man left the wards to get well at home.

November, 1853. A man, about forty years of age, and of quite healthy appearance, entered the wards on account of a necrosis of the lower jaw. The existence of the necrosis was evident; you had but to open the patient's mouth to be convinced of it. There was a point in his history worthy of attention; many cases of similar necrosis are met with, occurring after severe diseases—after smallpox, for instance; there was nothing of the kind here; moreover, there were no bad teeth; the patient had not been ptyalized; he did not employ mercury in any way in his business, nor did his profession expose him to the affection. There is one profession which does—the fabrication of phosphoric matches. It is very strange that, while in the fabrication of phosphorus itself, the affection is very rare, in the fabrication of matches it is very common. This man had never been exposed to the emanations from phosphorus. Without any known cause, there had been signs of inflammation, and of very intense inflammation, followed by abscess, and then by denuded bone. Whatever the cause might be, he came into the hospital with a piece of dead bone in his hand, which he had pulled away himself, and there was still some remaining. When the *interne* at M. Nélaton's request extracted a tooth in order to get at the sequestrum, a portion of dead bone was removed with it, and upon examination no more was to be found.

The lower jaw has very peculiar anatomical conditions; there is a nerve, having a long passage through it. What becomes of this nerve when a portion is eliminated? In the portion removed in this case was the dental canal, and it could be seen through; the nerve had gone, and, in these cases, the nerve disappears without causing any symptoms. Ask your patients, and they can tell you nothing.

There was a great deal of cholera, at that time, in the wards, and the man left immediately after the extraction of the sequestrum. At the end of one month he returned, saying that there was again some dead bone; a portion as large as a phalanx, which was movable, was extracted, and beside this, you could feel more denuded bone, that was fixed. It was a question whether it would not be better to free the patient, at once, of this denuded bone; such treatment of the case would be much more brilliant, but it was thought to be better to wait, for the exact extent of the disease was not known. Besides, to make a regular operation for the purpose of extracting the necrosed bone, the soft parts would have to be divided further than the disease extended, and it would be necessary to saw, or to act upon the bone in some way, in order to divide it. In this patient there was a great predisposition to necrosis, and it was reasonable to dread that the action of the saw and the division of the soft parts would add to it. The sequestrum was badly situated; it corresponded to the external angle of the jaw, and was not very accessible; but still, it was possible to get at it, and it is very easy—nothing can be more so—to dilate these fistulous openings. With a bougie, and then a sponge, you can come, after a few days, to introduce the finger. If you enlarge such openings by incisions, suppuration may take place, and, perhaps, the destruction of the periosteum may follow.

It happens every day that, in sounding a fistula, a bone is felt to be denuded; it is well established, there is no doubt about it, that, at the end of two or three months, it can be covered by a new tissue, and the fistula be closed. Sabatier, and the old surgeons, were aware of this, and they said that the sequestrum was absorbed, and then the parts healed up; it disappeared—therefore, said they, it must have been absorbed. Again, they show sequestra taken from parts in the way of getting well, and they say the bony tissue is lighter and changed. All this is altogether erroneous. M. Gerdy was the first to show that in the healthy bony tissue, in cases of necrosis, bloodvessels were formed, which acquired a considerable size, and formed the border, the true separation of the dead and living portions; and this border is irregular, on account of these vessels. In the dead part there is no loss of substance; all around it are seen, by the transparency of the bone, small spots in the osseous tissue; these spots are small vascular cavities, they are bloodvessels, and they are in greater abundance the nearer they are to the dead bone. These cavities at first are but capillary, but by the effect of interstitial absorption, they become larger and larger, and finish by causing the disappearance of all the bony tissue. It was easy to see how this must cause the formation of a line of elimination.

At a certain time, M. Nélaton was forced to bring proofs as to this point, that sequestra cannot be absorbed; and he made some very interesting experiments. He took a dog, whose bones were strong and well formed, and tried to produce a necrosis; it was no easy matter. He laid bare the tibia, and fired a pistol, the muzzle nearly in contact with it, *obliquely* against it, in order not to produce a fracture, and he never could produce a necrosis; never anything more than an osteitis. He then removed a piece by means of a trepan, threw it in hot water, and then replaced it; the wound was all reunited by first intention, and the piece of bone thus covered up. Unless the sequestrum is thus covered up, the dog will lick the wound, and find it. At the expiration of six months, the piece of bone had precisely the same weight as when it was put in. As it might be objected that it was not the same thing, pieces of necrosed human bone were placed in holes in the bones of animals, and always the same result was found. Sequestra bathed in pus do not undergo the slightest change; and, unfortunately, this is quite often observed upon the extremity of the bone in an amputated limb. Here all the parts are bathed in pus, and every condition favorable to absorption exists; but when, at the end of months, the extremity of bone is pulled away dead, the marks of the saw will be found as perfect as the moment when the operation was performed. The notion, then, of the absorption of sequestra must be rejected in the most formal manner. The surgeon, therefore, upon finding a bone denuded, should not always say that there is a *sequestrum*, and that the patient cannot recover before its elimination.

When the fistulous openings already existing were dilated, many pieces of dead bone were removed, but at the moment when the patient was about to leave, the parts became inflamed, and it terminated in the formation of another sequestrum. As it appeared movable, about the end of February, the opening in the soft parts was enlarged in order to extract it, but it was found to be not yet sufficiently loose, and it was left as it was, the patient being advised to leave the hospital and return after a time. He returned to the wards the very last day of April, when the bone was entirely loose. It was necessary to cut very little in this case, for fear of cutting the parotid, and the consequent formation of a salivary fistula, behind, and of meeting with the facial artery in front. The forceps were introduced, and the sequestrum drawn out of the opening; a probe-pointed bistoury was introduced alongside of it, and then, while it was being pulled, where most resistance was felt, incisions were made on either side; in this way large sequestra can be removed with the least possible division of tissue.

What ultimately became of this patient I do not know; when last seen, there was no more necrosis.

Caries of the Petrous Bone.

June, 1853. A young man, nineteen years of age, so well in appearance that it was not easy to believe that he had been suffering for any length of time, came into the wards. He said that, eighteen months before, he had had an attack of pneumonia, that had lasted fifty days, and that he had passed four months in convalescing. The attack, therefore, judging from this duration, was not at all ordinary pneumonia. During convalescence, whenever he blew his nose, he felt a hissing in the ear on the left side. Five months before his entrance, he commenced to have a discharge from that ear; every morning it was stopped up, and upon cleaning it out a clear liquid flowed away. In April, two months before, he said that this running changed from clear to purulent, and from that time he noticed that his face commenced to change; it was drawn toward the right side.

When he came into the hospital, there was an abundant discharge from the ear itself, and from the mastoidian region behind it, where there was a hole large enough to admit the end of the finger. All the muscles supplied by the facial nerve of the left side, were completely paralyzed. It was curious to observe him attempt to close his eye on that side; the cornea was turned upward, and slightly externally, and there was a slight movement of the lower lid alone. The orbicular muscle was completely paralyzed, and when the cornea was turned up, it drew with it the lower lid, on account of its connection with the fibrous envelop of the ball. This half-closure of the eye leads to inconveniences, not so great in this case as they generally are; usually the cornea becomes inflamed, here they were equally clear on both sides. This patient complained of the constant contact of the air, leading to a painful impression, preventing him from sleeping. He was annoyed, also, by his inability to blow his nose, on account of the impossibility of closing firmly the mouth. The pus also flowed from the Eustachian tube. The accumulation of pus does not readily flow by this tube, which is long, narrow, and lined by a mucous membrane, that becomes swollen, and renders the passage very narrow; it generally makes its way by perforating into other parts. When the pus had made another passage, the tube becomes clearer, and then the pus can flow through it. In this case, no pus, at first, came through the tube, and it commenced to do so three or four days after the admission of the patient into the hospital. It is a common occurrence, in these cases, for the suppuration in the cavity of the tympanum, to find its way by perforation into the cells of the mastoid process; the surgeon finds that region to be smooth, shining, and red, and making an opening, the probe passes deeply within. In this case, the opening had been spontaneous; it was so large that the finger could be introduced, and the probe showed the bone everywhere to be necrosed.

In such a case as this, an accident, suppuration inside of the cavity of the cranium, is possible, indeed very probable; and, as in private practice every accident not foreseen, not foretold, is supposed to be caused by your treatment, it must always be mentioned in the prognosis. The inflammation of the dura mater, and of the serous membranes, can give rise to an abscess in the brain, that is to say, in their inner side, before there is any suppuration between them and the bone itself. This has given rise to the mistake that these abscesses of the anterior portion of the middle lobe of the brain caused necrosis of the petrous portion of the temporal. The surgeon is warned of this accident by cephalalgia in the frontal and temporal regions, heaviness, vomitings, which are rarely wanting in cerebral affections, and nervous disorders, as hemiplegia. These could be looked for, in this patient, to occur at any moment.

Under such circumstances, could nothing be done for the patient; could not the bone be trepanned? If the limit of the osseous alteration were known, such an operation could be performed, but it was not, and it was to be feared that the case was one in which the limits of the disease could not be reached. The treatment of the case would, therefore, be limited to doing everything that can be done, to prevent the symptoms of putrid infection from manifesting themselves. The cavity would be washed out by injections, and the external openings kept open to a certain extent; and then, if at any time the opportunity should present itself, the necrosed bone would be taken away.

A symptom was observed in this patient, a few days after his entrance, that had completely escaped notice at first. He said that he experienced pain in certain parts. When, upon the left side, the finger was made to touch the point where the suborbital nerve emerges, or the part over the mental foramen, or those along the passage of the frontal nerve, he said he felt pain. When the tongue was very lightly pinched, on the paralyzed side, it was very painful; when the ball of the eye was pressed, he did not appear to suffer. The patient said that the pains were felt in these same points, when they were not touched. These symptoms, like those of the paralysis, from the compression of the facial nerve, were to be explained by the compression of the fifth pair. The petrous bone was necrosed; in its neighborhood was an *inflammatory atmosphere;* the fibrous parts in contact became infiltrated by the plastic exudation, and the nervous filaments suffered compression, where the fifth pair passes over the petrous bone. With such a condition of things, other symptoms could show themselves. Magendie's experiments show that the fifth pair of nerves exercises an influence over the nutrition of the ocular globe; when it is injured, there are at first symptoms of inflammation of the globe, not at all intense, the cornea becomes dull, and at last the eye is emptied by its sloughing away. For this, the injury must be inflicted upon the nerve, anteriorly to the ganglion of Gasser; posteriorly, it does not happen. This is very easily witnessed by taking a bird, and introducing a tenotome into the ear, dividing the nerve, wherever you choose, either before or behind the ganglion. When an *interne* of Dupuytren, M. Nélaton said that he had seen, in a case resembling the present one, in a young girl, this sloughing of the eye take place.

This boy had remained about two weeks in the wards, when he commenced to be more and more comatose, and finally died. I believe no autopsy was made in his case.

Affection of the Facial Nerve after a Fall.

February, 1854. A boy, about nineteen years of age, entered the wards, presenting most singular symptoms, of which M. Nélaton said he did not know another example. Just twenty-eight days before, he had fallen from a height upon the hard ground, striking upon the orbital region. He was stunned by the fall; and there was a wound of the external portion of the orbital region, nearly vertical, and three centimetres long. *The cicatrix of this wound upon the forehead was not adherent to the bone.* He was bled, and leeches were applied near the injured part; and at the expiration of twenty-four hours, consciousness returned. While getting well, he was attacked with the symptoms for which he came into the hospital; he had facial convulsions upon the left side, the side upon which he had been wounded.

The patient could scarcely make a few movements of mastication, wthout having a convulsion; it was almost invariable, and moreover, they sometimes took place without any assignable reason. The convulsion would occur two or three times after a piece of bread was taken, and then he would be able to eat it. When a piece of bread was given to him, after chewing upon it two or three times, he would suddenly stop, the lower jaw was then drawn down a little, the left commissure of the lip was also depressed, and then there were clonic and tonic convulsions—the lower jaw was drawn down and fixed, and then there were jerking movements. The nose was also affected, and likewise the tongue, the platisma myoides, and the muscles of the upper part of the neck, the digastric, &c., which explains the pulling down of the lower jaw. All the muscles, in fact, to which the left facial nerve is distributed, were affected with these convulsive movements.

What had happened in this case? Was there a lesion of the facial nerve from a fracture of the petrous bone? The patient, however, said that he never had had any pains in the mastoid region, nor had he ever lost any blood there. M. Nélaton had seen him soon after the accident, so that if there had been any ecchymosis in the mastoid region, he could have detected it. Between attacks of epilepsy, following wounds of the head, and this affection there is an immense difference; here, the facial nerve alone was affected, and there was no pain in any part whatever.

It was difficult to decide upon the treatment of this case, for it was not known what was the matter. As, however, it could be reasonably supposed to be some cerebral lesion, a congestion, M. Nélaton said he would apply cups to the posterior cervical region. Two cups were applied there four days after he came in, and two more, two days after the application of the others. The convulsions then ceased, and the boy went away perfectly well.

Paralysis of Facial Nerve, after Erysipelas.

January, 1854. A middle-aged woman entered the wards on account of the condition of one side of her face. She said that forty days before, she had had an attack of erysipelas; it was of importance also to know that she knew very well what erysipelas was, for at one period of her life she had been very subject to attacks of it. Four years before, she had been married, and afterward had no more of these attacks until the one that had left her with the symptoms for which she came into the hospital. The attack, therefore, under which she had suffered forty days before, was admitted to have been erysipelas, although it was a most exceptional case.

At that time, there was, on the right side of the face, a large wound, with anfractuosities, extending behind the condyle of the lower jaw, and between the condyle and the coronoid process. As far as could be seen, the bottom of the wound was covered by layers of granulations; over the masseter, where the jaws were pressed together, was something resembling somewhat the parotid, but it could not be ascertained if it was really that gland. When a probe was passed behind the angle of the jaw, it came in contact with denuded bone, at a portion of the jaw corresponding to near the condyle. The deviation of the nose, and of the mouth, all the symptoms indeed of paralysis of the facial nerve of the affected side, were present. The eyelids of course were separated, and, what was remarkable, although the eyeball was thus always exposed, day and night, there was as yet no injection of the conjunctiva; M. Nélaton said that he was well persuaded, nevertheless, that it would take place.

This case was said to be a very exceptional one, and for this reason, that it is almost without example that erysipelas should bring about hemiplegia. In this case, there had been an abscess in the parotid; the parts contained were injured, the facial nerve probably destroyed; now, this is a rare thing, for the nerves are found preserving their functions, and traversing large collections of pus. The nerve was thought to be destroyed, from the fact that the woman said that she had heard, for some time, a noise, a kind of singing sound, in her ears.

This woman remained a good while in the wards, but her paralysis was unchanged. Although the pus had been long in contact with the bone, and it was denuded and suppurating freely, yet the soft parts became united to it, and the whole wound closed without any elimination of bone.

CHAPTER XV.

AFFECTIONS OF THE LIP, TONGUE, ETC.

Cancer, or Cancroid of the Lip.

JUNE, 1852. A man, fifty years of age, and of a healthy appearance. Eighteen months before, he noticed a small pimple developing itself on the mucous portion of the lower lip; little by little it grew larger, and became very annoying. He then consulted a physician, who recognized it to be a cancerous, or, at least, a cancroid affection, and cauterized it with the nitrate of silver; as is always the case with the nitrate of silver, the cauterization was superficial. He went at last to a cancer curer, who applied the chloride of zinc, than which no caustic acts better in these cases, but, at the same time, there is not another equally painful. A fine cicatrix formed after this application, and during two or three months the lip remained well. The tumor, however, had reappeared, not precisely in the same spot, but very near it. "A cancroid tumor, totally removed, does not return," micrographs say. Nowadays they admit, what they at first denied, that the cancroid affection can reproduce itself in the nearest ganglion; and here was a case, where it could not be said that the return was owing to the tumor not having been wholly removed, for the disease was not upon the old spot. This theory, then, of cancroid tumors, had received a severe shock.

When the patient entered, the vertical diameter of the tumor from the upper to the lower portion was two centimetres, or eight lines, and the transverse diameter was four; it was situated almost entirely to the right of the median line. When the condition of the teeth was studied, four of them, the two incisors, the canine, and the first small molar, which were situated directly behind the diseased portion of the lip, seemed to be implanted in a soft tissue, covered with vegetations. The whole base of the lower jaw was extremely solid; these vegetations all corresponded to the alveolar border. In this case, the surgeon had to do with a cancer, that had not taken its departure from the bone, but from the soft tissue in front of it. The indication was, to limit the resection of the bone to the alveolar border. The lip would be divided from top to bottom, and all the diseased portion removed; for the resection of the bone, the teeth would be first extracted, for their roots are so hard they interfere with the division of the bone; with a bistoury an incision would be made down upon the periosteum beyond the diseased portion, which would be cut away by cutting forceps, or by the saw, if necessary.

The patient, during the dissection of the soft parts, was kept under the influence of chloroform; the diseased bone was removed by means of the forceps. In the phenomena following the operation there was nothing remarkable; one week afterward the bone was already covered with a granulating membrane, and it is quite rare to see it form so promptly. When the man left, the place had entirely healed, with no appearance of a return of the disease.

Portions of this tumor were given to two micrographs;[1] one of them said "it was entirely filled by cancer-cells, the best characterized; it was a cancer *type;*" the other said, "there are no cancer-cells, they are fibro-plastic; it is an epithelial cancer, the best characterized." When it concerns the finding of the normal elements of the normal tissues, the microscope, M. Nélaton said, is of great value, because they have been exactly studied, but for the morbid tissue it is not.

July, 1852. A man, seventy-four years of age, entered the wards, with an affection very often seen, a cancer of the lower lip. Twenty years before, for the first time, he had been to La Charité, with symptoms of the same disease, developed on the rosy portion of the lip. He was operated upon by Boyer, and the part removed by means of an incision shaped like a V, for he said that the sides had been reunited, and held together by hare-lip sutures. He remained, without any reappearance of the affection for fifteen years. When, at that time, the disease returned, he went to M. Jobert, who likewise removed it by a V-shaped incision. After that, there was again a temporary cure, that lasted for four years. When the disease returned for the third time, he consulted a surgeon in the country, who advised its removal, as before, by the knife, but the patient would not consent, and a caustic was applied, the nitrate of silver, whose action is superficial, and the disease continued to progress.

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[1] They were Monsieur Lebert and Monsieur Robin.

When the patient came to the hospital, the disease, at first glance, seemed to be but of small extent, but it was not so. About one-third of the free portion of the lip was seen to be affected; it was irregular, and full of hard, nipple-like projections, but the whole lip in the neighborhood of this presented considerable induration, and by reversing the lip, it was seen to be changed; there was upon it a peculiar ulceration of a granular aspect; granulations that seemed to *bristle* upon the lip, and these granulations covered also the anterior surface of the maxillary bone.

The disease, in this case, had reached a period when its progress is very rapid. It is said in books that "after the operation, the disease progressed more rapidly," but the operation was not the cause. Cancers do not have a uniform march; toward the end, their march is of frightful rapidity. M. Nélaton said he could go further, and say that when you operate upon a cancer, if you have a return of the disease, not only it does not march more rapidly, but it marches a little less rapidly than the original disease would have done at its termination. Supposing then that the surgeon cannot prevent a relapse, he can delay the fatal result. It was this consideration that induced M. Nélaton to operate in the present instance.

The part of the lip that was visibly altered, extended from the left commissure to a point half-way between the middle of the lip and the right commissure, and downward about three-quarters of an inch; the induration in the neighboring tissues extended some distance further; on the left side nearly an inch more. All this portion was removed, and also the mucous membrane covering the lower jaw.

None of the ganglions were removed—they were all healthy. The whole of the large wound healed up very well, and the man went away cured, at least temporarily so.

In February, 1853, seven months after he had left the wards without the trace of a relapse, he returned again with a similar disease developed in the neighborhood of the old one.

The man was seventy-four years of age, but his strength was well preserved, and he was calm and reasonable, consequently a good subject for an operation. The tumor removed before was epithelial, the kind of cancer the micrographs say is purely local, and, when a relapse does take place, it is always in the old situation, and is owing to the affection not having been entirely removed. After some time, however, they had to concede that the nearest ganglion could be affected, and in this case another concession was to be made, for the disease had not been developed in the lymphatics, but in the other tissues, and not at the cicatrix of the old affection. It could be said that it was another cancroid affection, a second local malady, just as two successive pneumonias may occur, but this M. Nélaton said was not to be admitted.

The patient, a few months after leaving the hospital, saw a tumor form on the side of the lower jaw, on the same side where the cancer of the lip had been, which increased in size, and contracted adherences with the cheek, in which several perforations took place.

The disease extended, when he entered the hospital, nearly as far back as the angle of the lower maxillary, and extended downward about one inch; the parts above the bone were perfectly healthy; the integuments alongside were affected, and contained two fistulous orifices from which came a sanious discharge. There was a kind of bridle extending from the tumor to the clavicle, which was the anterior edge of the platysma myoides, that had contracted adherences with the tumor. The carotid artery was attached to the internal and posterior portion. In the mass, it was impossible to say whether the submaxillary gland was affected or not. In regard to the connections of the tumor with the deeply-seated parts, which it was necessary to thoroughly understand, in swallowing, the larynx moved independently; as to the pharynx, it was not so certain; but if there was any connection, it was very slight, and capable of being destroyed.

This case was one of cancer of the bone, of which there are three forms. Sometimes cancer appears in a bone without changing at all its shape, taking exactly the form of the osseous tissue that disappears. At other times, there is an interstitial mass of cancerous tissue that pushes away the bone, and in proportion as it is thus pushed away, it is thinned until it forms a kind of shell. In the third form, the cancerous production is upon the exterior portion of the bone; the cancer is superficial, so much so, that it might be asked whether it was of the bone, or of the periosteum; it is indeed, generally called cancer of the periosteum. This case was thought to be one of this third variety.

As to the treatment, the affection was one which must, of necessity, grow worse every day; something, therefore, if it were possible, should be done, and an operation was the only thing; an operation, moreover, dangerous. In the first place, the age of the patient, though advanced, was not thought to contraindicate the operation, for in such cases, you must not judge from the *acte de naissance*, but from the preservation of the strength; this patient would have been judged, in this way, to be, at most, sixty years of age, and he was more fleshy than persons usually are. Do operations succeed badly in fat patients?

In operating in this case, a first incision would be made from the symphysis of the jaw, to the angle, running below the affected portion of the integuments, and preserving carefully all that were healthy; the soft parts would then be dissected from below upward, and upon reaching the place where the mucous tissues are attached to the bone, its resection would be proceeded with, by introducing the curved scissors, scraping the bone, and creating a passage for the chain-saw. The posterior part would be kept for the last, the separation would be made first in front. In operations upon the cervical region, the veins embarrass much more than the arteries; if a cut were made into the jugular vein, should a ligature be thrown around the opening, laterally, as Guthrie and Blandin have done? This, M. Nélaton had seen practised, and death had always resulted; it should be remembered that the ligature must cause mortification of the part, and in five or six days a consecutive hemorrhage takes place that proves fatal. He prefers to cover the opening well, and to trust to *tampons*; in this way, he had seen a case to recover, and by the other treatment, death always occurred. For the dental artery, a plug of wax would be kept ready to insert into the dental canal; at times, that vessel bleeds a good deal. The patient would be kept under the influence of chloroform during the dissection of all but the deeply-seated parts; there the finger must be kept in the mouth, and the patient should be able to spit.

The operation required the utmost care; the carotid was laid bare some distance, and the jugular vein, the opening of which was more dreaded, could be seen, distending. The facial vein, of necessity, was cut, and as its bleeding was annoying, it was tied. As to the tumor itself, it was of the external portion of the bone, as was supposed, but some of the internal portion was also attacked. On the third day of the operation, the condition of the patient was considered to be most satisfactory; there was but little fever, and, as regards the wound, it was doing perfectly well; on the fourth day, he became very quiet, seemed to be unwilling to be disturbed, and died. At the autopsy, in the lungs and brain there was nothing remarkable; in the pericardium was a sero-purulent liquid, and on the surface of the serous membrane were some of those cretaceous *plâques*, indices of preceding pericarditis. M. Nélaton, after considering everything, thought that the patient had died more from the prostration observed after severe operations, than from anything else.

By a strange coincidence, the very day on which the preceding patient died, an old man entered, upon whom M. Nélaton had removed a cancer of the lower lip, four years before. There had been no return, there, of the affection. Some time before, the patient had noticed a tumor forming itself on the cheek; it became an abscess, opened, and now he entered the hospital on account of the fistula, which remained.

On looking at the man's face, a want of symmetry was observed at once between the two sides; the right side, the seat of the fistula, was the larger, and the tumefaction was confined to the lower jaw. At a point on the cheek, corresponding to the second molar tooth, and about half the height of the bone, was a depression, in the bottom of which was the fistulous opening. By the touch, an induration could be felt there, extending from the symphysis of the jaw, beyond its angle, and from the gingival border, passing over the lower edge of the bone. This engorgment was not of the kind belonging to phlegmons, although they are harder here than elsewhere, at least, they are very hard here; but the density of this tumefaction was cartilaginous; it was something peculiar. It was difficult to say how deeply this extended behind; it was certain that the larynx was not affected. As to the pharynx, the opening in the mouth did not permit of its examination. In the preceding case, the patient could open the mouth very widely, and the walls of the pharynx could be seen not to be affected, but here, it was impossible. The internal face of the maxillary bone was healthy, but M. Nélaton thought that the deep parts in the pharynx were affected, for the finger could not be pushed into the infra-maxillary region; the tissues there were hard, and adherent to one another.

In this case, M. Nélaton refused to operate, for he was by no means certain of removing all the disease.

While examining this patient, M. Nélaton asked him whether he had had a bad tooth on that side, which had caused an abscess in the neighborhood; and, indeed, the condition of things resembled that very much. In the other patient, that is, the one who had just been operated upon, the fistulous orifice was situated in a small lump, ulcerated on the top—and this is generally seen in cancer—while here it was in a depression. A bad tooth could cause the formation of a dental fistula after a cancer had existed; and, again, such a fistula can cause very extensive induration. The patient had the root of a tooth left, but it was in the upper jaw, and if caused by it, the fistula would have been placed much higher; the course of a collection of pus formed there, would have been quite different, as it is easy to understand.

Sometimes these collections of pus caused by a bad tooth, open externally very far from the tooth itself. M. Nélaton related a case, which he had been called to see, where the fistulous orifice was of the clavicle. This fistula had lasted for eight years, and after searching in vain in the vertebræ, and everywhere, for the cause of a suppuration of such long duration, search was made in the mouth, and a decayed tooth was found. The patient sometimes had pain in that tooth, and by careful examination, a sort of cord was found running from it as far as the fistulous opening. The tooth was pulled, and in a few days the patient was well.

This is why so thorough a search was made for a decayed tooth that might have caused the induration here.

December, 1852. A patient, about fifty years of age, who had the same affection several years before, when it showed itself after commencing as a pimple. The disease had been excised, but had again made its appearance, not, however, at exactly the same place. The altered part of the lip had quite a considerable extent; at least one-half of the lip was affected, nearer to the left commissure than the right, and reaching two-thirds of the way down to the base of the chin. To remove it, it would be necessary to lay bare the maxillary bone, and perhaps to scrape it. Two incisions would be made, departing from the free edge of the lip, meeting at an angle below the diseased part, and then prolonged downward, nearly to the hyoid bone. So much of the lip would then be removed that, in order to give it a requisite extent, incisions would be made from the commissures on each side, and prolonged backward, parallel to the base of the jaw; when then the parts were drawn together, the upper lip, covered with mucous membrane, would not unite with the bleeding surface beneath it.

In operating, M. Nélaton made a first incision, commencing in front of the symphysis of the jaw, and carried backward to nearly the hyoid bone; by means of curved scissors, he separated the lip from the bone; and then, with the scalpel, he removed the diseased tissues by the V-shaped incision. In order to give sufficient mobility to the flaps at the sides, they were separated from the bone for some distance, by cutting very closely to the bone, so as not to divide the facial artery. The incisions at the angles of the mouth were made last, and the parts, being held in proper position by the ordinary sutures, water dressings were applied, instead of the usual cerate and charpie. During the operation, the vessels were tied as they were divided. The wound healed very rapidly, and the man went out apparently cured, and with very little deformity.

In the month of March, only three months afterwards, he came back again to the hospital. To the right of the median line, half way between the mouth and the bone of the jaw, was a tumor, conoid, smooth, red, and ulcerated at the summit; it could readily have been taken for a furuncle. For a distance of half an inch, all around this tumor, further at the sides than above and below, the tissues were hardened and thickened; elsewhere, all was natural.

This was a second relapse, the disease having been removed twice before; these were unfavorable conditions for an operation, but the man was young and robust. These cancers are less disposed to return than others, but it is necessary to remove the whole disease, and this is more difficult than would be supposed. There is such a union in these parts, of the skin with the muscles, normally, that *mobility of tissue cannot be sought as a sign of freedom from disease.* M. Nélaton said that, perhaps, in his previous operation, he had not removed all that he should have done. It was his duty to operate again in this case, and, warned by what had occurred, the incisions would be carried very far. What had been done at the other operation, could not be again performed, and another method was thought of, which he supposed to be new. The disease would be removed by two incisions, which would leave an elliptical opening in the lip, and this opening was to be filled up, as much as possible, from the parts below. For this purpose, an incision, following the inferior edge of the jaws, was to be made through the skin, the platysma myoides, &c., and the parts contained between it and the opening would then be dissected free from the deeply-seated tissues. This flap, adhering by its two extremities, this *bridge-flap*, would then be slid up, and applying its upper edge to the upper edge of the opening, the parts would be kept in position by the usual sutures.

It was very useful to witness the result of this operation; on the fourth day, attention was required to see where the upper edge of the flap had been placed in contact with the superior edge of the opening; the union was most exact. When the man left, he was well, and he did not return.

March, 1852. A man, sixty years of age, of a robust constitution. Three years before, a small pimple made its appearance on the rosy portion of the lip; it was pulled away by a surgeon, but the disease had been constantly spreading, until he came to the hospital. The man himself attributed the affection of the lip to his habit of smoking; as to this effect, M. Nélaton said, he was much less persuaded than many other surgeons, and the older he became, the less inclined he was to attribute to external causes the origin of diseases such as cancer or scrofula. Moreover, if the use of the pipe had this effect, how can it be explained that the affection is upon the lower lip, almost invariably? In this case, the extent of the degenerescence was not at all considerable; there was a thin, oval, slit-open, irregular mass, that seemed to be superposed upon the lip.

In cancers of the lip, you often find a degenerated ganglion situated near the median line, two centimetres behind the symphysis; and very often this ganglion is situated on the side opposite to the disease in the lip. M. Nélaton said that he was disposed to believe that, some day, anatomical researches would show a crossing over of the lymphatics, as has been shown for the genital organs. In this case, there was no affection of the ganglions.

The diseased portion of the lip was excised by a curved incision; the loss of substance, at the time, appeared to be very great, but it was, in a very great measure, restored by the time the wound had healed. The man left, perfectly well.

March, 1854. An old man, who had been a soldier for many years; he had been at the battles of Fleurus, and of Leipzig, and at one of them had received a wound from a spent ball, on the lip, which had broken two of his teeth. This, in his opinion, was the cause of his present affection, and although this was not to be believed, still it was thought proper to mention it.

Two years before coming to the hospital, a small pimple formed itself upon the mucous portion of the lip; it extended little by little, and when he entered, the circumstances were very unfavorable for its removal; the extent of the disease was very great, and the lymphatics were affected. The ulceration, and the surrounding thickening of the lower lip, it is important to state with exactness. The ulceration extended from the left commissure beyond the median line, and downward, more than half way to the base of the chin; the tissues were hardened and thickened, all around this ulcerated portion, to the distance of about one inch. The lip was adherent to the lower jaw, adhering by granulations resembling syphilitic vegetations; the extent of the adhesion was considerable, being almost as great as that of the hardened portion of the lip. The free border of the jawbone, the border for the implantation of the teeth, was attacked, and the whole of the symphysis, except the very lowest part. One ganglion just behind the symphysis, and a second, just behind this one, were degenerated.

There could be no hesitation in the diagnosis: the affection was cancerous—what is now called *cancroid;* yet, when the evolution of the disease is considered, the invasion of the lymphatics, and the affection of the whole system, they must be considered the same. All that can be said is this, that cancers of the lower lip have a slower progress, and *perhaps*, relapse less often than others; but, besides this, there is no difference between them, not the least. When the progress is called *slow*, it is meant to be so for a certain period, it may be even for six or eight years, and then it is very rapid; in this instance, in one more year, the poor man would be in a frightful condition.

An unfavorable circumstance, in this case, was the age of the patient; he was sixty-seven, and he appeared more; he had a look of great fatigue. The whole of the disease must be taken away, and, to do so, a great deal would have to be sacrificed. The soft parts, covering the chin, were affected throughout almost that whole region, and, moreover, they adhered to the jaw. M. Nélaton had seen such cases, where it was thought sufficient to scrape the bone, and then to cauterize, but the disease returned; all that portion of the bone, therefore, would have to be removed. It was a question, also, how the vacancy, caused by so large a removal of soft parts, was to be filled up. M. Serres, in such cases, makes two vertical and parallel incisions, one on each side of the disease, descending far below it; he then excises the diseased portion, and dissects loose the rest of the flap, as far as the level of the pharynx; this is then carried up, until its upper edge is at the level of the lip, and fastened there by sutures. When this is practised, you are astonished by the facility with which it is executed at the time; but in a few days the flap, which does not allow the slightest backward motion of the head, becomes detached, descends, takes its old position, and leaves the jaw exposed. Every operation of autoplasty, where there is traction upon the flap, is compromised. M. Serres also performs another operation: Making two horizontal and parallel incisions, one from the commissure of the lip, and the other from the lower portion of the excised tissues; the intervening soft parts are then dissected loose, so as to allow of the movement of the flap, in order to bring its anterior edge in contact with the opposite side of the space left vacant by the removal of the affection. This operation has the same inconvenience as the other, where the loss of substance is great. Neither of these operations would be employed in this case; there was here, however, a circumstance to be considered: that, as a portion of the bone was to be removed there would be but a small spot requiring to be covered.

Every one has heard of the retraction of the tongue, in these cases of resection of the anterior portion of the lower jaw; that which happens at the moment of the operation is not meant, but a consecutive retraction, giving rise to dyspnœa, and to a slow asphyxia. This is explained by a retrocession of the tongue, not sufficient to completely stop up the air-passages, but to singularly narrow them. The lower maxillary bone forms a parabolic curve, and when the ends are brought in contact after the removal of a central portion, they will meet in such a way as to press back the tongue, which will be thus exposed to produce slow asphyxia.

In the operation, the degenerated portion of the lip would first be removed, the bone would then be resected, and if it were possible then to put the soft parts together, it would be done. It was thought very probable that this would be the case, but if not, an incision would be made parallel to the lower edge of the vacant space, and a *bridge* would be dissected loose, and pushed up so as to cover it. By this means, it was hoped that a lip could be made, and one that would not push back the bones against the tongue. As to the mode of operating, after removing the soft parts with the scalpel, the chain-saw would be passed behind the bone, in order to do which, a passage would be made for it by cutting around the bone with curved scissors. In using the chain-saw, the angle formed at the bone sawed against should be as great as possible, that is to say, the instrument should be as nearly in a straight line as possible; moreover, the handles should be parallel, in the same plane, or the chain will be twisted, and thus it cannot act.

The operation was performed exactly as described; the edges of the soft parts were brought together without the formation of a flap to fill the gap. The patient, during the first steps of the operation, was under the influence of chloroform. At the expiration of the first forty-eight hours after the operation, its results, so far as could then be determined, were excellent; there was no hemorrhage, no febrile movement, or but very little, no delirium at night, nor any sign of future accidents; good nourishment, bouillon, and wine were given to the patient, for he was feeble, and the parts were very often cleaned.

A few days after this, the patient died, it was said, of pneumonia; I did not see the autopsy, but was told that pus had found its way down into the mediastinum.

April, 1854. A man, sixty-eight years of age. More than ten years before, a pimple formed upon the rosy portion of the lip, upon which a scab would form, and fall off again; this was repeated an infinite number of times, and the neighboring parts became engorged, and the pimple much enlarged. A surgeon, to whom he had shown the lip, cauterized the part, and that not being sufficient, he excised it; what is so often seen, however, in these cases, the disease returned. One danger in this operation, is only excising the disease incompletely, and it is more often a danger here than elsewhere, for very often the disease is cutaneous and subcutaneous at the same time, and when you cut away only what you see, you often leave some of it. Remove *too much*. In order to cut away *enough*, you must cut away *too much*. In this instance, the relapse was speedy, the disease had made rapid progress, and a very considerable proportion of the lower part of the face was then affected. The edge of the lower lip, in its whole extent, was irregular and ulcerated; the soft parts were indurated to the base of the jaw, and, moreover, adherent to the bone; the disease had a greater extent on the inside of the lip than on the outside. That portion of the bone to which the lip adhered was degenerated; it was soft, and could be moved; it is unnecessary to say, that the few teeth there were very loose. Again, behind the bone, lumps of cancerous matter were felt, and when the ganglions were examined, they were found to be engorged; the whole floor of the mouth contained them.

In spite of the certain death that must result from this disease, M. Nélaton said it must not be operated upon. The patient was old, and the operation would be a very serious one; not only the whole chin, but a great part of the lower maxilla, a great portion of the floor of the mouth, and all the degenerated ganglions would have to be removed; moreover, the skin was so altered, that it would be necessary to sacrifice it largely, and incisions would have to be made afterward in the soft parts in order to reconstitute. All this would render the operation very serious; it is true that, every day, serious operations are performed, but that is where there is a chance of cure, and here it was not the same thing; it was certain that the whole disease could not be removed, and it was, therefore, certain that a relapse would soon follow. M. Nélaton said he knew that many surgeons would operate in this case, attracted by a brilliant operation; they do such things when young, and then give them up; when younger, he would have performed an operation in this case himself.

The old man did not remain in the wards.

In the following instance, the disease occupied the upper lip.

February, 1853. A man, seventy years of age. He said that the disease had commenced only six months before; but it was evidently older than that. The upper lip, on the left side, presented a tumor, which commenced near the centre, and extended to the commissure; inside of the mouth, *as is always the case*, the extent of the disease was still greater; there it went up, as far as the wing of the nose, while externally it went but half so far. The surface of the tumor was red and granulating, covered in some places by scabs, and bleeding with facility. The patient said he had pricking pains in it; there was no swelling of any of the ganglions.

In order to remove completely the diseased parts, it was necessary to take away the left half of the lip, and the tissues adjacent, nearly an inch beyond the angle of the mouth. In order to bring the parts more readily in contact, a vertical incision was made in the lower lip, commencing where the commissure had been, which enabled the lower flap to be moved more easily upward. The man soon left the wards, well, and without great deformity.

Cancroid of the Cheek.

July, 1852. A woman, sixty-five years of age, entered the wards, to be treated for a small tumor situated in the cheek, on the left side, near the nose. The tumor was the size of a small hazelnut, and was contained partly in the skin and partly in the subcutaneous cellular tissue; it was quite hard, the portion in the cellular tissue being the hardest; that in the skin was full of small grains, giving it a *grumous* aspect. Scabs formed upon it, which became detached, from time to time, to be followed by others. The patient complained of itching, rather than of pain. This tumor was a *noli me tangere*—a cancroid; they have but a moderate tendency to return after their removal, but it must not be delayed too long a time, or the ganglions will be attacked, and all the symptoms of cancer will take place.

There are two varieties of these tumors; in one they are more deeply seated than in the other. When the skin alone is affected, there is a treatment, employed by Dupuytren, that succeeds very well; a paste, composed of ninety-six parts of calomel and four of arsenious acid, mixed with water, is spread in a layer over the parts; at the expiration of three or four days, it detaches itself, drawing with it the part underneath, and after that, a cicatrix forms. Almost always, one application is sufficient. This method, however, would not answer in the present case, when the parts beneath the skin were affected; the caustic could be used to destroy the skin, and then the knife made use of for the rest; but it was thought preferable to remove all, at once, by the knife.

Before bringing the edges of the wound in contact, after the removal of the tumor, M. Nélaton waited until it was perfectly dry; for he believed that the presence of altered blood in a wound has a certain influence in the production of erysipelas, of which there was a good deal at that time in the wards.

The wound healed without any accident, and the patient left the wards, in a few days, well.

In some remarks made under the head of *Cancer*, it was stated that many diseases, essentially different in their anatomy, are often confounded under that name. All those tumors, formerly confounded with cancer, but which are not so, that affect the skin and the mucous membranes, and which, when ulcerated, progressively invade the tissues, as well in depth as in breadth, are comprehended, since the works of Lebert, under the name of *Cancroid.*

These tumors, from their situation, point of origin, and structure, may be divided into three kinds: *hypertrophied cutaneous*, or *mucous glands*—the hypertrophy being chiefly of the epithelium, the elements of which are multiplied, at the same time that they are a little increased in size; secondly, *papillary epidermic tumors*, that is to say, tumors in which there is considerable hypertrophy of the papilla, and, at the same time, of the epithelium covering them—epithelium, which invades the interstice of the fibres of the tissues on which it reposes; thirdly, tumors in which there is, at the same time, the preceding alteration and simple and fibroplastic hypertrophy of the derm—tumors called, in certain parts of the body, as at the vulva (a case of which will be found reported), *esthiomènes.* These last two kinds of tumors, the epidermic tumors and the papilliform, above all, are those that constitute what is called *noli me tangere.*

In these tumors, the lymphatic ganglions are attacked, for they also are provided with epithelium, and the disease returns after their removal; for in removing the tumors, the neighboring normal tissues are not removed; and the disease having originated in them once, why should it not a second time, and a third? These two facts have caused them to be confounded with cancer, from which they differ essentially, not only in their elements, but also in their march; they never produce that profound alteration of the organism known as *cancerous cachexia*—an alteration manifested by the air of suffering, and the extreme paleness of the patient, and the condition of the skin, which is cold and dry, like parchment.

A want of knowledge of the intimate constitution of the normal and of the morbid tissues, has caused an implicit belief in an essential difference of nature and of properties between morbid products and the normal parts. This has led to the belief that tumors which return, when once they have been removed, differ essentially from others, and constitute, from that alone, a distinct group, clearly limited (*malignant tumors, cancerous tumors*). Experience and observation show, however, that among the tumors which return, some are constituted by anatomical elements different from those normally existing in the economy, as tubercle and cancer; now, not knowing why such a tumor is produced at first, no reason can be given why it should not be reproduced a second time; they show, also, that other tumors, as the fibro-plastic, the fibrous, glandular hypertrophies, epithelial, etc., more frequently than the preceding, are formed of elements of the same kind as those existing in the normal organism; now, as the cause which determined the local hypergenesis of the elements composing them is unknown, so no more is it known why they should not be reproduced either on the same spot or elsewhere, *so long as any elements of the same kind are remaining in the economy*, and everywhere where there are any.

The impossibility of knowing by what cancer is characterized—for without the microscope it is impossible, as the elements which characterize the normal and morbid tissues cannot be seen by the naked eye—having made surgeons insist that the fact of a return of the affection, after an operation, is the characteristic sign of cancer, this first error has led them into others. Thus some have maintained that those who use the microscope have denied that epithelial, fibro-plastic, and other tumors, could return, which has never been said. Both when the disease returns in the same place, or in a distant part, this return can, in no case, be invoked as proving that a certain kind of tumor, rather than another, has to be dealt with. The removal of the tumor does not cause the hypergenesis of the elements which constitute the tumor to disappear, nor the elements of the same kind which exist in the rest of the body; there is no reason, therefore, why this phenomenon should not manifest itself again in the cicatrix, and in distant parts provided with elements of the same kind.

It is not more astonishing, therefore, after the removal of an epithelial tumor, to see another appear in adjacent, or in distant organs, than to see the first make its appearance. In the case of cancer or of tubercle, there is this difference, that, in them, there is not hypergenesis of a pre-existing element, but a generation of heteromorphous elements, taking place a second time from the same cause that had determined the first production.

The fact that the lymphatic ganglions are often attacked in these affections, called *cancroid*, which, it must be said, is an unfortunate name, and which it would be much better to designate by one founded upon their anatomy, has also been used in order to prove their identity with cancer. But it is well known that, in the healthy ganglions, nuclear and pavement epitheliums exist; and general physiology, teaching that where there is analogy, or identity of elementary anatomical constitution, there is also analogy of nutrition, of development, and of reproduction, as well in the morbid state as in the healthy, it should not be surprising to see these ganglions manifesting errors of nutrition, of development, and of reproduction in their epitheliums, when those of the cutaneous, mucous, or glandular region, to which they correspond, are diseased, just as is seen in cases where these membranes are wounded or inflamed.

It is from not knowing the differences which separate the varieties of epitheliums; the different ways in which they are placed on the surface of the papillæ of the derm in warts and corns, and on the internal surface of the glandular tubes; and their mode of pathological production among the fibres of the tissues, that many authors refuse to admit that products as different as warts, and the epithelial tumors invading bones, have for their fundamental element cells of the same kind. Others deny the fact, supporting their denial on the hypothesis that epitheliums are a product, secreted or excreted, and without vitality. But this hypothesis has long ago been shown to be false. The parts of the body are divided into *constituents* and *products;* the epitheliums enter into this last group, and are characterized, physiologically, by the absence of animal properties; but in return, like all the other elements which are in this condition, they enjoy, in the very highest degree, vegetable properties, and are, of all the elements, those most certainly endowed with the properties of nutrition, development, and reproduction. It is for this reason that, when they are produced very abundantly, they cause the absorption of most of the other elements of the tissues, and invade them, with the exception of the cartilages, the elastic fibres, and the arteries.

It was said above, that cancroid affections could be divided into three kinds: hypertrophied cutaneous, or mucous glands, papillary epidermic tumors, and tumors in which there is the preceding alteration, and, at the same time, simple and fibro-plastic hypertrophy of the derm.

Hypertrophied glands form tumors, which vary in their exterior appearance according to the kind of gland affected. In the same gland, they can, moreover, present different appearances, for all the elements can augment in quantity about equally, or the glandular *culs-de-sac* with the epithelium contained in them, or the walls of the *culs-de-sac* without any change in the epithelium, or, and this is most frequent, the glandular epitheliums may augment in quantity and size.[1] When this takes place, the *culs-de-sac* are distended, and the color and consistence of the tissue completely changed; the walls of the *culs-de-sac*, at last, are often atrophied, and the tumor loses its glandular appearance to assume that of eating ulcer, epithelial tumor, or cancroid disease. Under the head of *Lipoma*, some observations will be found on this kind of epithelial tumor occurring in the sebaceous glands. Cancer can be produced in the hypertrophied glands as well as in the healthy, and the fact, although rare, has been observed in the rectum, in the liver, in the neck of the uterus, and in the lips. The examination of the intimate structure of different portions of the product should, therefore, always be made.

Papillary epidermic tumors is the name given to the variety of cancroid tumors in which the papillæ of the skin, or of the mucous membranes, are increased in size, chiefly from the thickening of the epithelium covering them, with induration and thickening of the subjacent derm. If the scab, which is often seen covering these tumors, and which is formed of dry pus mixed with epithelium, be removed, the papillary cones will be seen beneath, having a whitish-gray appearance. This appearance is owing to the thick conical sheath of epithelium that covers the papilla itself, which is represented by a thin filament of granular amorphous matter, containing from two to four capillaries, placed in the centre. This variety of tumors often originate in warts, above all those covered with small projections. These papillary epidermic tumors are very distinct from epithelial tumors having their origin in hypertrophy of the glands; these, on account of their origin and position, have more generally a rounded form, a more considerable volume, and tend more than the others to extend deeply, and invade the neighboring tissues, as the bones; as is often seen in the lower jaw.

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[1] See Glandular Hypertrophies.

Whatever may have been the starting point of the cancroid tumor, or epithelioma, as Hannover wishes to call them, they are composed of the following anatomical elements: *Epithelial cells* of one, or of several, of the four varieties. They are often of a very great size, and remarkable for their strange shapes; always, however, easily recognized as epitheliums. *Special granular bodies*, to which, as yet, no name has been given, formed of an almost homogeneous mass, containing in the centre dark-colored granulations; their diameter is from 0.020 millimetre to 0.080 millimetre, or, $\frac{1}{1250}$ to $\frac{1}{310}$ inch. Sometimes granular globules of inflammation. Often, what is called *epidermic globes*, first described by Lebert. They are generally found in the folds of the rectum, of the anus, and in the œsophagus; but small, and not in all subjects. They are found, also, on the surface of syphilitic vegetations, above all, in what are called cauliflower excrescences. These epidermic globes have a diameter of 0.005 millimetre ($\frac{1}{5000}$ inch), but can be even 0.25 millimetre ($\frac{1}{100}$ inch). They are formed of a central mass of granular amorphous matter, which is surrounded by several layers of pavement epithelial cells, placed like the scales of an onion. The largest are formed of several of these globes, placed together, and in turn englobed in a new layer of scales. Amorphous matter is generally very abundant, particularly in the tumors of the pituitary membrane, or of the neck of the uterus. There are, besides, cytoblastions, at least very often; fibro-plastic elements, capillaries, and often crystals of cholesterine.

Syphilitic (?) Ulceration of the Face.

December, 1852. A man, about fifty years of age, entered the hospital with an extensive ulceration in the anterior portion of his face, rendering him most repulsive.

Ten years before, a small pimple had made its appearance on the projecting portion of the right cheek, and, after suppurating, the ulceration continued to progress on one side, while it healed on the other; advancing thus toward the centre of the face. This continued until, in 1851, the extent of the disease was quite great, and he went to a hospital to be operated upon. The altered tissues were excised, but the parts never healed up well again, and the disease recommenced its progress.

When he came to the hospital, the upper lip was almost destroyed; it was divided into two portions, of which the right was much the smaller. This division was complete; the inside of the nose and of the mouth was exposed. By looking deeply, the ulceration was seen not to be limited to the superficial parts merely, but the parts internally, to some distance, were ulcerated and covered with granulations.

The patient was well examined, but, he said, he never had had anything the matter with him but two attacks of gonorrhœa, and those when very young, and that he never had had any sore throat, or roseola, or falling of the hair, or other signs of syphilis. Notwithstanding this, the ulceration was believed to be syphilitic, both from its own appearance, and from the absence of the signs met with in other ulcerations. If it had been cancer, a cancerous mass would have been found, with ulcerations everywhere; moreover, there was here no tendency to hemorrhage, and *the bones had preserved their hardness.* This was a character much insisted upon by M. Nélaton, that the bone experiences quite marked degeneration in cancerous affections of this kind, and one of the first signs of cancer at the maxilla would be a loosening of the teeth; here the patient had but one tooth in the neighborhood, and that was perfectly firm. A cancerous affection in ten years would have advanced much further; and, lastly, the effects of treatment rendered it most probable that it was syphilitic; in the course of the past year, a surgeon had prescribed some pills for him, and, after taking sixty, the disease retrograded, but, for want of money, he was unable to continue taking them. M. Nélaton, taking everything into consideration, did not hesitate to diagnose the affection to be a symptom of tertiary syphilis.

Iodide of potassium would be prescribed, sixteen grains at first, to be increased to sixty, in three doses, every day. No mercury would be associated with it, for one is generally quite sufficient, and the man had probably taken a good deal already. Under the influence of this treatment, M. Nélaton expected that the ulceration would cicatrize in about two months, when an operation would be performed to render the face less repulsive.

M. Nélaton's expectations were disappointed, and the iodide of potassium completely failed to arrest the disease, both alone and combined with the protiodide of mercury. It was then attempted to destroy portions by applications of caustic, but with no apparent benefit.

This patient remained in the wards for six months, toward the expiration of which time he commenced to improve, under the use of the *tisane de Feltz*.[1] I do not know what became of him afterward.

Cancer of the Tongue.

November, 1852. A man, fifty-eight years of age, occupied as a shoemaker, came into the wards with a cancer of the tongue. He said he had never been sick, and that among his relatives there had never been any affection, having any relation to the one he then had; the patient himself attributed it, among other causes, to smoking. M. Roux attributes many cancers of this region to the action of smoking, but cancer of the tongue was common before the use of tobacco; and, moreover, how does it happen, if cancer be caused by the action of smoking, that it is almost invariably the lower lip, and not the upper, that is affected? The pipe touches both.

In August, the patient had felt some difficulty in mashing his food with his tongue, from a small tumor, that made its appearance on the upper part, on the right side. No treatment had been applied, and the tumor had grown larger, had ulcerated, and given rise to a good deal of hemorrhage. At the time of his entrance, the disease extended from the tip of the tongue to within an inch of the epiglottis, and over the median line, so as to cover two-thirds of the tongue transversely. The soft parts beneath, separated by a deep fissure, were also degenerated, as far as the maxillary bone; further back was an indurated ganglion, evidently degenerated; it seemed, moreover, as if the submaxillary gland were affected, but great care must be exercised here, for the gland can be pushed out of its situation by the disease of the soft parts, and be only displaced, and not enlarged; as a general rule, the gland escapes the degeneration in cancerous affection of the tongue.

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[1] A decoction of sulphuret of antimony, sarsaparilla, and isinglass.

The condition of this patient was most serious. Boyer says that all patients affected by ulcerated cancer of the tongue, die within a year; and M. Nélaton was not disposed to think this an exaggeration. Again, there can be nothing more horrible than such a death from cancer. Although, therefore, the circumstances were very unfavorable, it was decided to perform a most serious operation. In these operations, M. Roux and M. Sedillot have had the idea of previously making an incision in front, down upon the bone, and then dividing it so that the portions can be separated and the tongue exposed. As regards the condition of the patient after the extirpation of the tongue, so far as speech is concerned, he gets along very well; the tongue is not indispensably necessary for speech; in congenital absence of that organ, for three or four years the child does not speak, but, afterward, he acquires the power of doing so very well.

After previously separating the jaw, in the median line, the tongue was removed by means of the curved scissors, just in front of the epiglottis, and, after that was executed, the diseased parts below were removed. By careful examination of these parts, after their removal, the maxillary gland was seen to be perfectly healthy.

In dressing the wound, a gutter of lead was placed over the divided jaw, after the method of M. Robert, and kept in its situation by means of a silver wire passed over it, and the ends of which were brought out of the opening in the floor of the mouth, left open for the ends of the ligatures. The operation was not followed by hemorrhage, nor by accidents peculiar to the operation; for, after it, an œdematous laryngitis has been seen, the swelling taking that course, in the consecutive inflammation. His pulse was noticed, after the operation, to be somewhat irregular, and, although this is nothing to make the surgeon anxious, as it is seen in persons perfectly well, it is, nevertheless, a thing to which attention should be given. The piece of lead, which, from the decomposing action of the liquid of the mouth, might give rise to symptoms of lead poisoning, was replaced by one of gutta percha.

Injections were made into the mouth, to cleanse it thoroughly, and keep the patient from the danger of putrid infection.

In this case, the wound healed, and the patient left the wards well.

January, 1853. A young man, a student of medicine, thirty-five years of age. When twenty-eight years of age, he had an attack of angina, and after it he noticed on the lateral portion of the tongue a white spot; in two months, the white spot disappeared, and was replaced by an ulceration, the edges of which afterward became hard; the hardness went deeper and deeper into the tongue, and lancinating pains commenced. Cauterizations were had recourse to, but they were only superficial; the nitrate of silver was used, and, internally, the iodide of potassium was taken. The patient had never had syphilis. The disease, for some time, appeared to remain stationary, but it is well known how patients deceive themselves about this; three weeks before his entrance, it again commenced to progress.

When he came in, the whole right side of the tongue, and a great portion of the left, were affected from near the lip to just before the epiglottis; the ulceration was deepest at the posterior portion, corresponding to the base of the anterior arch of the palate. When asked to put out the tongue, he could not—it was carried toward the right side; there was but a movement of torsion on its axis. The disease entered into the parenchyma of the organ; it was not limited to the ulcers seen superficially; and the hardness extended beyond the median line. On the right side, the hardness extended manifestly beyond the tongue; it could not be separated from the jaw, to which it was fixed by a hard tissue; a portion of the anterior pillar of the palate was altered, but behind that all the parts were healthy.

Nothing but syphilis could resemble this disease, and in this case there was none. When, in the diagnosis of these diseases, such men as Blandin have been deceived, an exploratory treatment should always be employed, as had been done in this instance, before proceeding to an operation.

The operation would be the same performed before; the lower jaw would be divided and the part separated; the complete section of the tongue would be made with the curved scissors, and the arteries tied as they were cut; it is an operation more frightful than difficult. The operation was performed upon the patient on the bed. The tongue, just in front of the epiglottis, the anterior arch of the palate, and the soft parts near the last molar, and the coronoid process, were all removed. There were some difficulties in the operation, as the tongue did not yield to traction made in order to pull it out; this must be expected when a cancer of the tongue propagates itself, as this one did, to the soft parts at the sides. When the middle of the tongue was divided, there was a flow of blood, quite difficult to arrest; there are two arteries there, at the median line, and when one is seized, the other still continues to bleed. In making the transverse section of the tongue, the surgeon should cut very slowly, for the jet from one artery embarrasses very much in tying the other. For the removal of the diseased tissues, shaped like a mushroom, situated on the side of the lower jaw, a needle was passed between them and the bone, carrying a double ligature, the ends of which were then tied on each side. The next day, the two portions of the inferior maxillary were placed in contact, and held so, as had been done in the preceding case. The patient was doing very well; he complained only of thirst. Injections were made frequently during the day, to cleanse the mouth, in order to avoid the dangers of putrid infection. The operation had succeeded admirably, and the patient was doing very well, when, on the thirtieth day of the operation, he had a chill, which was the commencement of an inflammation of the right parotid gland. The patient died eight days afterward, from this inflammation of the gland.

At the autopsy, the parotid was found full of small collections of pus, contained in small abscesses, from which it could be made to come out by pressing. Although a large mass had been removed at the operation, there was but a small ulceration left. Where the same had acted upon the bone, there was a superficial necrosis, which is quite often seen.

November, 1853. A man, formerly an officer in the army, fifty-five years of age, and with the appearance of strength. He had had pains in a certain part of the tongue for some time, when in the month of August, while treating himself for an attack of angina, the present affection was first seen. Cauterizations with nitrate of silver were practised, and then with the solution of the pernitrate of mercury, but they did not arrest the disease.

Upon examination, the left border of the tongue, in its posterior part, presented an induration, which was propagated in the inside of the organ to about the median line, and forward to near the tip. Besides, the groove between the tongue and the jaw was invaded; the tissues there were found to be indurated, as far forward as the symphysis, and beyond the median line; backward, the induration extended just to the arch of the palate. In regard to the depth to which this induration extended, when the fingers were placed under the jaw, it was found to be not less than the thickness of the lower jaw itself, and that the indurated tissues were firmly attached to that bone. There was no affection of the lymphatics. The affection was, without doubt, a cancerous degeneration; it could possibly be but one other, a syphilitic affection, and syphilis the patient had never had; and, moreover, the disease did not have the appearance of ulcerated syphilitic nodes.

In this disease, Boyer says that, in one year after the period of ulceration arrives, death takes place, and he does not exaggerate; the suffering is horrible. It is the *duty* of the surgeon, if there be the slightest chance, to operate in one of these cases, and duty alone could force a surgeon to undertake so serious and frightful an operation, and one in which the chance of the return of the disease is so great. M. Nélaton said that he had never seen two years go by before a relapse, after an operation for cancer of the tongue. In this case, from the position of the diseased parts, the ligature could not be employed; and the extirpation by the knife was the only method applicable. Such an operation would be attended by many difficulties, for the tongue would have to be removed near its base, and there was not space sufficient to do so through the opening in the mouth; the lower maxilla would have to be divided, and the halves separated. There is one thing to be mentioned, in regard to making a transverse section of the tongue—that the two lingual arteries are very near the median line; they furnish a great deal of blood, and only one jet is seen; you seize a vessel, and the blood still flows; you drop it, and seize another place, from which it then appears to come, and it is still the same thing. To provide against this difficulty, the incision should be made very slowly, and the vessel tied as soon as it is encountered. In spite of every care, it is a dangerous and painful operation; the patient cannot be placed under the full influence of anæsthetics; a part of it should be performed while he is sitting up, and the blood falls into the pharynx; moreover, it may be followed by hemorrhages; and the maxillary bone is divided.

The operation was performed as has been indicated; the limits of the disease were largely passed in every direction, and the whole of it removed. Before applying the dressings, M. Nélaton waited until all flow of blood had ceased; until the whole of the large cavity was dry. Shortly after he had left the hospital, the patient was seized with a hemorrhage; it was very abundant, and bright red—evidently arterial. The *interne* undid the sutures, and searched for the vessel in the bottom of the wound; it could not be found, but, by the application of ice, the hemorrhage ceased; as soon, however, as the wound was again closed, it commenced again. M. Nélaton was sent for, and when he arrived the bleeding had ceased, and he went away, after remaining half an hour, ordering, if it commenced again, that the wound should be exposed, and, if the vessel could not be found, that lint, with perchloride of iron, should be applied. The hemorrhage making its appearance again, this was done; the patient suffered horribly, fearfully, but the bleeding was arrested, and did not again return. M. Nélaton said that this was the second time that he had made such an application; the first time, it was in a case of uterine hemorrhage from cancer of the neck; the actual cautery was several times applied, and when the eschars fell, the hemorrhage recommenced; he then did what had been done in the present case, and the hemorrhage was arrested, and did not return for a long time.

All this, as might be supposed, had not been done without a great disturbance of the bandages. It was not thought proper to put the disunited edges again in contact, immediately, but it was judged better to wait for five or six days, until the two surfaces were covered with granulations, when they would be joined together by means of sutures. The general condition of the patient, notwithstanding this trouble, was excellent. There are, in this operation, immediate and consecutive accidents to be dreaded. The first, one much dreaded by M. Nélaton, did not take place; from the rude handling of the parts, he feared an œdematous inflammation of the larynx, which has sometimes been observed after operations upon the jaws and the tongue. The hemorrhage was definitely arrested by the application of the perchloride of iron, which M. Nélaton thinks produces a veritable cauterization, rather than a simply astringent action upon the part. This idea seemed true; for, in a few days, from the surface of the wound, to which it had been applied, coriaceous pieces were removed, very different from dry mucus. A consecutive danger, that of purulent affection—the despair of surgeons—was still to be dreaded.

Four weeks after the operation, when the patient was apparently in the way of getting well, one morning a profound alteration in his countenance was visible to every one; upon examination, signs of pneumonia were found, and in three days the patient was dead. At the autopsy, the two lower lobes of the right lung were found hepatized. It was not possible to make a thorough examination of the body, but upon examining into the condition of the right shoulder, where there had been an old luxation of the humerus, of twelve years' standing, suppuration was found to have taken place in the false articulation, which had been formed for the head of the bone, under, and to some degree, inside of the coracoid process. There was, also, a vast abscess in the axilla of the same side. The luxation had been what some authors, as, for instance, M. Velpeau, call subclavicular.

Glandular Tumor of the Velum Palati.

November, 1851. A man, twenty-eight years of age, entered the wards. He had, upon the soft portion of the palate, a tumor the size of a hazel-nut, situated in the median line. This tumor was movable with the velum palati; it was very hard; there were no lancinating pains; nor was there pulsation in it. It was movable, also, in the soft palate; it had not contracted adhesions with the tissues around it. The question was, whether this tumor was not cancerous. In the first place, it had commenced fifteen years before; and this long duration, and the integrity of the neighboring tissues, were decidedly opposed to such a supposition;

moreover, if cancerous, it would, in all probability, give rise to pains. Again, the tumor was hard, and scirrhous tumors more than the encephaloid, give rise to adhesions with the surrounding tissues. It was very possible that the tumor was a hypertrophy of one of the small glands of the palate. In the velum palati, there are two layers; the anterior one is composed of glands, the posterior layer is fibro-muscular; and this tumor was developed in the anterior portion. The point of origin, the *point de départ*, of a tumor, should always be found.

A vertical incision, an inch and a half in length, was made, and the tumor was extracted with the greatest facility. By examination with the microscope, its elements were found to be the same with those of the glands; it was a tumor formed by the hypertrophy of a gland. In two weeks, the wound healed, and the man left. The voice and deglutition were both benefited by the operation.

Hare-Lip.

June, 1853. A child, eight days old, and that had been born before term, was brought to be operated upon for hare-lip. It was a case of simple hare-lip, the fissure to the left of the median line.

M. Nélaton has a method of operating in these cases, to which he attaches great importance, the method by *intermediary bridge*, by *living suture.* An incision is made all around the opening, at a certain distance from the edge forming a sort of inverted V; in order to do this well, the angles of the lip must be hooked by a tenaculum. This portion of the lip is then turned downward, and the sides of the lozenge-shaped opening which is then left are placed in contact by sutures. Even if the sutures yield, the depressed portion of the lip still holds a living suture, and by degrees the hole that is left is obliterated.

This operation was performed; two days afterward the sutures were removed, and the parts had perfectly united. It is well to remove the sutures as soon as possible, and sometimes M. Nélaton withdraws them at the end of twenty-four hours. In order to remove them, the child must be held motionless; an assistant holds the cheeks, pushing them toward the mouth, and keeps them thus until the child is somewhat calmed, when court-plaster is applied before he withdraws his hands, and the child is given to suck.

When this plan of operating is employed, M. Nélaton has never known it to fail. I have seen it answer admirably a number of times, myself. Its advantages are very great, for a child must suck, and he will cry, and rub his lips; all this destroys the dressings placed over the parts, and the sutures ulcerate and become loose. When, however, this operation has been performed, the edges swell and become covered with granulations, and a *natural suture* is formed, and remains, even if the others do give way, and exactly at the inferior part of the lip, where it is most needed. Even if the primary union does not take place, a secondary union does, just as regular and just as good.

In one case this small depressed flap mortified, and upon examination, M. Nélaton was well satisfied that it had been occasioned by the sutures above it. He said that he had so much confidence in secondary union, that he asked himself whether it was worth while to endeavor to produce primary union; this, however, might be pushing things to an extreme, and he contented himself, in future, with placing one suture, for the purpose of preventing the depressed flap from returning to its position.

To show how, without any previous vivification of the edges, suppurating surfaces may be made to unite, M. Nélaton relates several cases of rupture of the perineum in confinement. In one, the whole perineum, the sphincter ani, and a portion of the wall between the vagina and rectum were torn. He saw the patient on the fourth day, and at once applied sutures, which were removed three days afterward. By opium, the bowels were kept locked up for twenty-one days, and, strange to say, when they were opened the feces were not hard; the woman was perfectly cured. In another similar case, the sutures were applied on the seventh day; and defecation prevented by opiates for thirty days, when again the feces were not hard; this patient was perfectly cured also. In another instance, on the twelfth day of a gunshot wound, from the days of July, in the external ear, the edges, in full suppuration, were placed in contact and held by sutures, and although it might have been supposed that the presence of the cartilages would interfere, they still united.

February, 1854. A child, but a few days old, was brought to the wards with a very complicated hare-lip. Beside a large opening in the lip toward the left side, there was division of the soft parts of the palate, of the bones, and of the alveolar processes. Between the incisive and the canine teeth of the left side, the separation was so considerable, that the little finger could be passed between the sides without touching them. Not only that, but the right side was pushed forward, and the left backward, which would complicate an operation considerably.

An operation here was difficult, for there were material difficulties, and the parts were badly situated, and it was upon a child. In the first place, it was dangerous to life, for there can be an immediate hemorrhage; and there can be consecutive depression from pain. Besides, it was very possible that in a few days an aphthous stomatitis would appear, together with a condition of system from which the child would not recover.

But again, this poor child, an object of repulsion, would be neglected, so that very probably it would not live; and if it did, the operation is not exempt from danger at the age of seven or ten years.

In this case, at the lip, it would be impossible to make the usual bridge, for there was no angle above; something very similar, however, could be done; flaps could be cut on each side, and turned down and united.

Before placing any sutures in the flaps themselves, the lateral portions of the lip were brought nearer together by the method known as that of Phillips. A strong needle was passed through the base of the nose, just behind the sides, a piece of pasteboard was then passed on each extremity of the needle, and also a small round piece of cork, by approximating which the sides of the nose are brought together. The surgeon must remember the sub-orbital foramen, and the nerve which comes out; it is very near to the points where the needle is passed.

After passing this strong needle, three smaller needles for twisted sutures were placed below. Two days afterward the lower needle was removed, for that portion of the flap had perfectly united. The larger needle was left on for six days, after which time the parts will not return to their old position.

The condition of the child was very much improved by what was done.

Ranula.

November, 1852. A man, about forty years of age, entered the wards for ranula. The history of the treatment he had already undergone was given, in order to show the difficulty there sometimes is in treating these tumors. In the summer of 1849, he went to M. Jobert, on account of a tumor situated under the tongue; they were about to operate upon him, when the tumor opened of itself. In the month of October, the tumor had returned, and M. Boyer, at the Hôtel Dieu, cut it out. Early in 1850, the swelling under the tongue had again returned, and he went a second time to M. Boyer, who again excised it; this time the operation was upon the left side, at the other, it was upon the right. In October of the same year, it had again returned, and M. Boyer made, this time, two punctures into it, one under the tongue, and the other externally under the jaw, for the tumor commenced to show itself there. These punctures only relieved him for a short time, and in January, 1851, he went to M. Thierry, who passed a leaden wire into the tumor, under the jaw, and left it in place for eight days; this produced nothing satisfactory. In November, the same surgeon placed a seton in the interior of the mouth, and afterward he made a third operation, in which a seton was passed inside of the mouth, through the tumor, and made to come out under the jaw. This last operation was followed by great inflammation, and M. Thierry being sick, M. Velpeau attended to the case; he made an incision two inches in length, into the large swelling, and the patient was relieved. M. Thierry afterward applied the instrument of Dupuytren, which resembles a shirt-button with a canal through the centre. This history shows how much had been done to cure one of these tumors, and how it persisted in spite of all.

In regard to the nature of this affection, ranula was long thought to be owing to a dilatation of the duct of Wharton, and this opinion was believed to be true, until some new researches were made about ten years ago. The fact is, that in the great majority of cases, the canal is not obstructed; in this instance, the patient being exposed to a clear light, and the point of the duct watched, a little salt being placed upon the tongue, when it melted, and there was a sensation of taste, there was a flow of liquid from the orifice. Moreover, the liquid that is drawn from these cysts is not the same with that which comes from the duct; it is very viscous, more so even than the white of egg. M. Fleischman considers these cysts to be simply an enlargement of a *bourse muqueuse*, which he maintains to always exist in this situation; but the existence of this *bourse* is called in question by most anatomists, and M. Nélaton said he did not believe it. M. Nélaton considers these tumors to be mucous cysts; why they are always developed in the same place, he does not know. There was, in this case, an extension of the tumor posteriorly, which is easily understood, when the anatomy of the region is considered; it was placed between the hyo-glossus and mylo-hyoideus muscles.

In order to cure the patient, the whole of the sac, the buccal and the submaxillary portions, would have to be obliterated. For this purpose, injections of iodine would be made use of. The membrane lining the whole of the interior of the cyst being lined by a thick viscous liquid, it must be thoroughly washed, without which the injection of iodine does not come in contact with the parts upon which it is to act.

The puncture was made with a bistoury, and, after washing the sac clean of its viscous contents, the injection was made. At the end of twenty-four hours, the tumor was reproduced; it had the same volume as before, was a little harder, and painful to the touch. Nothing more was done; things were allowed to have their course. On the fifth day, a commencement of absorption was evident in the swelling, which went on more rapidly than is usual after such injections, and the patient finally left, cured of his affection.

The same operation was performed in the month of June, 1852, upon a woman, whose case presented nothing remarkable. The operation was equally successful.

June, 1853. A man, who, five months before, noticed a tumor below the tongue, at the side of the frænum. He showed it to a physician, who made a puncture into it, and extracted a matter resembling the white of egg. He thought himself cured, but the swelling returned. This time, the physician to whom he showed it recognized the case; he excised a great portion of the tumor, and tried to destroy the rest by means of charpie dipped in a solution of nitrate of silver. In spite of all, the affection had returned. M. Nélaton said he had seen Gerdy, at St. Louis, cauterize these cysts with the hot iron, and still they would come back.

As the affection was supposed to be a dilatation of the salivary duct, from retention of the saliva, it was thought that it must be cured, by creating a free course to the flow of the saliva. For this purpose, setons have been employed, and metallic wires, and the shirt-button of Dupuytren, all with about the same result; no one of them always succeeds. An operation of Jobert is very ingenious, but it is not often successful even in his hands; the mucous membrane covering these cysts, which is very movable, is raised up and excised; into the external wall of the cyst, thus made bare, an incision is made, the edges of which are everted, and united by sutures to the edges of the mucous membrane of the mouth, which is thus rendered continuous with that of the cyst. This operation is like that of Dieffenbach, for cases of occlusion of the mouth. If, in such cases, the operation is limited to a simple incision, the parts again come together; to avoid this, the scissors are pushed between the skin and the mucous membrane, so as to remove a triangle; a simple incision is then made in the mucous membrane thus laid bare, and its edges united to those of the skin; no adhesion is, therefore, possible between the opposing parts, both being covered with mucous membrane. M. Forchet has modified this operation by making the incision into the sac a crucial one, and turning back the four corners. A far more simple method of treating these tumors, and one that succeeds more often, is that by iodine injections. These, however, always fail, unless one indispensable part of the operation is attended to; the cyst is filled by a very viscous liquid, and in order that the injection may act, it must be perfectly emptied. After the puncture, pressure must be made upon all parts of the tumor in order to empty it as much as possible, and then it must be frequently washed out with water. In this way, M. Nélaton said he had almost invariably succeeded.

After puncturing the cyst, and emptying it as much as possible, injections of water were thrown in, until it came out almost as clear as when it entered, and then the iodine was made use of. The swelling, at the end of forty-eight hours, was as great as it had been before, and on the fifth day of the operation, fearing a return of the affection, without waiting any longer, a second puncture was made, a viscous liquid extracted, and iodine again injected. The swelling that followed was rapidly absorbed, and twelve days afterward the patient left, with everything to indicate that the second injection had been successful.

In November, being about to perform this same operation, M. Nélaton referred to this case, and said there had, so far, been no symptom of a return of the affection.[1]

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[1] In the settlement of the question, as to what is the real seat of this affection, the microscope would be of great service. All normal, glandular cavities have an epithelium; accidental cysts do not have any. In cysts of the ovary, of the thyroid gland, &c., the epithelium is always found; and if ranula were but a dilatation of a normal glandular cavity, an epithelium would also be found upon the interior of the surrounding membrane.

CHAPTER XVI.

GANGLIONARY TUMORS OF THE NECK—GENERAL HYPERTROPHY OF THE LYMPHATICS.

Ganglionary Tumors of the Neck.

THERE are few regions of the body where the lymphatic ganglions are met with in greater number than in that of the neck; it is not strange, therefore, when the exposed condition of the parts to which they belong is also considered, that ganglionary engorgements should so often be observed there. In the supra-hyoidean region, many ganglions are found behind, external to, and before the carotid arteries; others surround the maxillary gland; some are placed above this gland, in the course of the facial artery and vein; others, again, are met with between the mylo-hyoid muscle, the inferior maxilla, the digastric and the cervical aponeurosis. All these ganglions receive the contents of the lymphatics of the pharynx, of the interior of the mouth, and of the face.

In the sub-hyoid region, the ganglions form a chain around the primitive carotid artery, and the internal jugular vein; some are placed behind the sub-thyroid venous plexus. In the supra-clavicular region, a great number of ganglions also exist, some of which are situated below the sterno-mastoid muscle, others behind the clavicle, others in the triangular space above that bone, intercepted by the sterno-mastoid and the trapezius muscles.

November, 1851. A woman, thirty years of age, of quite a good constitution; she never had had any serious illness.

After a confinement, that had taken place a few months before, she noticed a pain in the region of the sterno-mastoid muscle, and, afterward, a ganglionary swelling there. The swelling disappeared after using some ointment given to her by her physician, but it was followed by a tumor in another region, in the supra-clavicular. It commenced to appear in the hollow above the clavicle, and had gradually acquired a great size.

When the patient came to the hospital, this tumor was larger than the two fists. It commenced about three-quarters of an inch from the acromial extremity of the clavicle; its inferior edge followed the whole of the posterior border of that bone; internally, it passed under the sterno-mastoid muscle, to very near the median line of the neck, and externally, it propagated itself to some distance under the trapezius. It was covered by the platysma myoides, as could be seen by making the woman contract it, when the rugosities it causes were very manifest. This muscle is contracted by drawing the corner of the mouth downward and outward. There were no lancinating pains in the tumor. The condition of the integuments covering it was perfectly healthy. There was no development of the subcutaneous veins.

There was no fluctuation in the tumor, nor any *bruit-de-souffle;* hence it was neither liquid nor vascular; it was a solid body. The question to be decided, therefore, was, to which of the four great orders of solid tumors it belonged. It was not a lipoma, because it did not possess that feeling of pliantness, of suppleness, like a mass of cotton, found in adipose tumors. It was not fibrous, because it had a different feeling, and, moreover, the development had been very rapid. It was not encephaloid, because the subcutaneous veins were not dilated, and there were no lancinating pains. Was, then, this tumor ganglionic? It had taken its birth in a region abounding in ganglions; in some portions it was hard, in others it was soft; it was surrounded by a chaplet of other ganglions; and it was free from pain. In M. Nélaton's opinion, therefore, it was owing to an enlargement of the ganglions.

Sometimes, such tumors are enormous; they have been seen as large as the head of an adult.

When these tumors are examined, in those portions that are soft, are found effusions, resembling the lees of wine. Their envelop is a cyst, and this cyst forms adhesions with the neighbering parts, above all, with the nerves, which become very large. This cyst is formed of the cellular tunic of the ganglions, more or less hypertrophied.

On account of the enormous development of this tumor, the deformity produced by it, and the trouble it caused to respiration and to deglutition, it was decided to remove it by an operation. In this proceeding, the integuments would be largely divided by an incision, in the shape of a T, and the flaps turned aside, so as to expose the posterior part. As to the dangers of the operation, those resulting from wounds of the arteries were not much to be feared; those of the veins, however, are much to be dreaded. The veins in the cervical region dilate and contract with the respiration; their walls are very thin, and the wounding of them may give rise to the introduction of air. In order to avoid it, in the enucleation of these tumors, a sharp instrument should never be used, except when it is absolutely necessary; the fingers must always be used, except when some bands may be too strong to be thus torn.

The tumor, thus removed, was formed of two portions: of a fibrous tissue, forming a kind of shell; and inside, of enlarged ganglions. During the operation, there was a good deal of blood lost. Loss of blood is a cause of death, from operations, not only immediately, but some days afterward; the loss may be so great that the patient cannot repair it. In some places, where the tumor had contracted very close adhesions, as much as could be easily isolated was cut off, leaving the rest adherent. In these cases it is not necessary, as in cancerous tumors, to extirpate the whole tumor; the suppuration that follows this kind of resection soon destroys the part left in the wound, and cicatrization takes place almost as promptly as after complete extirpation.

In the course of ten days, all the parts left had been melted away by the suppuration; the wound, afterward, rapidly healed up, and the patient left cured.

May, 1852. A patient, upon whom an operation, quite similar to the one performed in the preceding case, had been practised, died in the course of a few days.

The patient was a stoutly built young man, who had a simple engorgement of the cervical ganglions; it had existed for seven years, and treatment could do nothing for it. He was so very anxious to have the tumor removed by an operation, that M. Nélaton finally consented. A sort of chaplet of ganglions existed, beginning near the parotid and extending under the same condition of the constitution, as the one for which he was then in the wards.

Questions were put to him, in order to find the cause of this condition of body. The patient was one of a family of four children, very badly lodged, and badly nourished; he had never eaten meat more than once a week, and very often could get nothing but dry bread. These are the causes of these lymphatic tumors.

One of these tumors was situated just below the angle of the jaw; another near the sterno-mastoid muscle; another was under the jaw, almost in the median line; and there were others in various other places. There was no redness in the skin covering them, nor were there any adhesions; the tumors were movable, *rolling*, as they say. Their consistence was quite softish, giving a sensation very much resembling a liquid; if not careful, the surgeon may be led into error by this peculiar softness, simulating fluidity. It must be recollected that the cause of error, resulting from the mobility of the tumor, is not counted; only that from the peculiar softness and elasticity of the tumor, is meant. The contents of these tumors are often as soft as those of encephaloid, and it is well known to give a feeling of fluctuation.

These tumors had lasted for three years; at first, M. Nélaton decided to extirpate them, but as the boy had never been treated at all, and he could be fed well in the wards, he preferred to try, for a month or two, and see what would be gained. By this, perhaps, the cicatrices of the neck, those stigmata, could be avoided.

The boy became tired, at the expiration of a few days, and went out.

The following case, on account of the diagnosis, is placed here, in connection with tumors of the cervical region, caused by ganglionary enlargements, although the probabilities are that it was a cancerous affection.

May, 1853. A man, forty years of age, of a very dark complexion, and, apparently, strong. Seven months before, in September, he remarked, for the first time, a small tumor, placed beneath the inferior maxillary bone, on the left side of the neck. The surgeon should always find out *at what point the disease was* *seen to originate.* At that time it was small, about the size of the last phalanx of the thumb, and *already hard.* He showed it to his physician, who was astonished at its hardness. Different resolutives were applied, but with no benefit; and, therefore, he came to the hospital.

This tumor was then enormous. It extended from the mastoid process to within an inch of the clavicle, and forward nearly to the median line. The fibres of the sterno-mastoid muscle covering it, were so flattened as to be scarcely recognizable; the trapezius muscle also covered it. When movements were impressed upon it, a hard mass was felt, with which the whole head moved. Nor was this all; on examining the interior of the mouth, it was seen that the right opening (at the side of the uvula) only existed; the left tonsil was pushed over, and had even passed the median line; it was plain that the tonsil was healthy, and that behind it was another projection, formed by the tumor itself. Its consistence was considerable; it varied somewhat, but, as a whole, it was hard. Lancinating pains were felt in it.

This tumor acted upon the neighboring parts, and already caused trouble. An alteration of the voice was plainly marked, from the pressure upon the larynx, the left lateral portion of which was pushed backward and inward. Also, from the compression of the œsophagus, the patient could only swallow liquids. There were, also, symptoms, though slightly marked, resulting from compression of the vessels; he experienced, at times, a feeling of dizziness.

What was this swelling? It was not from the parotid, for it had not commenced in that region; and, moreover, such tumors are developed slowly, requiring, there, four or five years to acquire such a volume. Again, when there is a degeneration of the parotid, it determines a facial paralysis, by compression of the facial nerve. This tumor and the lower jaw, also, were independent: every one knows how the gland is situated, and how it is connected with the lower maxillary, above all when enlarged and diseased; but when this man was asked to move his jaw, he did so very well. The same thing was true for the thyroid gland, for the larynx moved with facility.

The tumor originated either in a lymphatic ganglion, or in the submaxillary gland; and the latter M. Nélaton also excluded, for the same reason he had given for the parotid, that the tumor had been rapidly developed.

Was it a simple ganglionary enlargement, or was it cancerous? It must not be supposed that its size excluded the idea of its being the former; from cases he has seen, M. Nélaton said he had made the formula, that *there is no limit to the development of a ganglion.* They, however, only reach such a point after many years. Besides, it is very rare that a ganglionary tumor is isolated; an agglomeration of tumors is found, in which different ganglions can be distinguished. In the character of the pain there was something peculiar—it was lancinating. It must be added, moreover, that though ganglionary tumors do sometimes have adhesions with neighboring parts, it is nevertheless quite rare; they form most intimate adhesions with the nerves, and that is about all. With cancerous tumors it is different.

In this case, then, M. Nélaton said he must diagnose a cancerous tumor; and it was a serious thing to do so, for no surgeon in his senses would undertake the extirpation of the tumor, if it were of that nature. It would be necessary to remove every portion of it; and in doing so, it would be almost impossible to avoid injuring the veins, with walls so very thin, and swelling with the respiration: the veins are expressly spoken of, because, in this region, there is more risk from the veins than from the arteries. It is well to know that when an encephaloid tumor has a very rapid growth, it enters into the veins; in this case, there was no œdema, no signs of obliteration of the veins. There would be danger, also, of wounding arteries, not only the carotid, but also the branches of the subclavian. It was very probable that the tumor had connections with the brachial plexus.

Sometimes, it is as responsible to say there is nothing to be done, as to risk an operation. If, in this case, the tumor were cancerous, there was nothing to be done; if not, there was something. A small piece of its tissue would, therefore, be taken and examined by the microscope; if seen not to be cancerous, *perhaps* something would be done. If cancerous, it is necessary to be very particular to remove the whole of a tumor; but if ganglionary, it is not necessary to cut all away, if it should be troublesome to do so. If not cancerous, a resection would be made of as much as could easily be removed by the knife; the rest could be destroyed by caustics; and by leaving it, it would all be taken away by suppuration.

Unfortunately, M. Nélaton was obliged, on account of his health, to absent himself from the hospital for nearly three weeks; and in the mean time, before anything further had been done, this patient left.

In the following case, the tumor was of a melanotic character; but being interesting, likewise, from its situation, it is placed in this position, with others of the cervical region, though of a different nature.

May, 1852. A young man, twenty-five years of age, and well built.

He had been in the hospital long before, on account of a tumor of the neck, believed to be a hypertrophied ganglion; but on removing it, it was found to be melanotic. The tumor returned, and was a second time removed. It again returned, and, a third time, was operated upon. Returning a fourth time, M. Nélaton himself had destroyed it by the application of caustic. The patient was presenting himself, therefore, for the fifth time.

The tumor was of an oval shape; its greatest diameter, which was nearly two inches, was placed horizontally. The scalenus muscle was external and anterior to it; the anterior jugular vein passed before it; and the subclavian artery, with which it was in contact, was below and behind it. Relative to the neighboring parts, the tumor was fixed.

Notwithstanding all these unfavorable circumstances, M. Nélaton thought it to be proper to make another attempt to extirpate this tumor.

An incision, shaped like an inverted T, was made; and in order to avoid the artery, the operation was proceeded with as if it had been desired to place a ligature around it. From the operations, and the applications of caustic, it was feared that there would be difficulties almost insurmountable in separating the artery from the neighboring parts; but the operation proved to be very easy. The whole of the cyst, with the cellular tissue enveloping it, was removed.

The wound healed by granulation; and, at the expiration of twenty-four days, the patient left well. In May, 1853, the last time I heard of this patient, there were no signs of a return of the affection.

General Hypertrophy of the Lymphatic Ganglions.

February, 1854. A man entered the wards with a very rare disease, a general hypertrophy of all the lymphatic ganglions. As he lay in bed, his head and shoulders only exposed, he appeared to be enormously fat. He was about forty years of age, and a bookbinder by profession.

It was about eight months since he had first noticed his affection. The symptoms announcing it, were a difficulty in swallowing, above all, in drinking, and an inability to breathe with perfect freedom. Afterward he had dizziness in the head, so great, at times, as to produce loss of consciousness.

There was great breadth of face, and it could be felt not to be owing to simple *embonpoint*. This condition extended down to the clavicles; from the ears down, the increase in breadth was very considerable. By the touch, masses of lymphatic ganglions were found.

M. Nélaton said he had already seen this disease several times, and it had always appeared to him to be a chronic affection. He had tried for one and two years to produce an effect upon it, by a variety of means, but he had never found anything to be of service.

In all the persons in whom he had seen it, except the last (this present case was the fifth he had met with), they had been badly fed, and he had attributed the affection to that. In this instance, however, the patient was very wealthy; he was from Rio Janeiro, and attributed the disease, himself, to intermittent fever. He had tried everything; he had travelled to cure himself, and had spent some time on the Island of Madeira; he was then in Paris. In his case, M. Nélaton said, the ganglions were as large as his fist. M. Nélaton had tried the effect of stimulants, and, by his advice, the patient had undergone a course of hydropathic treatment; but nothing had been gained.

Recently, however, some cures of ganglionary enlargment by electricity had been published in the medical journals, and for the purpose of trying it, this patient was brought to the hospital.

M. Nélaton himself had never had the opportunity of following the treatment, and could not say what might be the effect upon the economy—what might be the ultimate result of its employment.

One of these reported cases was of the cervical ganglions; after having resisted everything, they went away under the influence of galvanism. The apparatus of Breton was used, a metallic collar being placed around the neck. There is no danger attending this mode of treatment, and extirpation is not free from it. M. Nélaton said he would not call it a very serious operation, but one of his patients had died after it; moreover, the operation leaves a cicatrix, a highly important consideration with a female patient. If resolution could be obtained by this means, it would be an immense advantage.

In this case, galvanism was tried for some time; at first the patient imagined some of his symptoms, the dizziness, particularly, to be benefited, but in the course of a few weeks, he left, not in the least improved.

The preceding case was a most unfavorable one, for there was a general diathesis; there was a manifest general disposition to ganglionary engorgements.

In April, 1854, a short time after he had gone out, the same method, the use of galvanism, was applied, in a case of hypertrophy of the submaxillary ganglions alone.

The patient was a young man, twenty-four years of age, and in very good health. The affection had lasted for six years. M. Nélaton did not think there was any tuberculous deposit in the enlarged ganglions.

The galvanic apparatus of Breton was used every day for more than a month, at the expiration of which time, nothing at all had been gained. It was still, however, thought proper to continue; with what success, eventually, I do not know.

The magneto-electric apparatus of the *frères* Breton, as it is usually called, the one used in the preceding cases, has for its essential part a horseshoe magnet, around which is wrapped, in a helix, a conducting wire. In front of the magnet is a bar of soft iron, that can be made to rotate by means of a crank. Every time that the bar approaches the poles of the magnet, an inductive current is produced in the conducting wire, and every time that it is removed it produces another current in the opposite direction. The apparatus is provided with a piece by which the current is interrupted; by this the formation of an inverse current is determined, which is collected; the graduation of the instrument is obtained by approaching or removing the iron bar.

The currents produced by this apparatus are excellently well adapted to producing the phenomena of muscular contraction and of sensibility; but their chemical and calorific action is almost nothing. They really do not appear to be adapted to cases like the preceding, and it is hardly fair to judge from their effect, as to the influence of electricity in the cure of ganglionary engorgements.

The currents given by the voltaic pile (while less suitable than the inductive currents, for the purpose of producing the phenomena of the contraction of the muscles, and of sensibility), on account of the calorific and chemical effects that accompany them, would seem to be more appropriate. They should always be chosen when it is desired to develop a chemical phenomenon, such as the coagulation of the blood or the modification of a secretion. Upon the retina, their action is very powerful, while that of the inductive currents is very feeble.

The magneto-electric apparatus of Duchenne, spoken of as used in a case of muscular paralysis, is composed, like that of the *frères* Breton, of a horseshoe magnet, on which is placed the wire, in which the current is to be induced; over this first wire, a second is rolled, destined to receive the induction of the first. Each of the currents can be separately collected. The regulator is a double cylinder of copper, by which the wires can be covered to a greater or less extent.

CHAPTER XVII.

AFFECTIONS OF THE MAMMARY GLAND.

Neuralgia of the Mammary Gland.

NOVEMBER, 1851. A young man, twenty-one years of age, and apparently enjoying excellent health. He said, that at the age of seventeen he commenced to suffer in his left breast; the contact of his shirt, the slightest movement, caused pain. In the month of March, the gland had been amputated, and, one month afterward, the right one was affected.

The nipple was a little larger than it generally is in men, and slightly red; towards the internal portion was a nucleus, a small, hard part, but the density was far from attaining that of scirrhous tissue. There was no alteration of the neighboring parts; the induration was completely circumscribed, and the skin was entirely natural. In neuralgias of the breast, there is always an indurated point. The pain was constant, but at some times was much more severe than at others; when the patient was angry, it was particularly severe.

In regard to the treatment, M. Nélaton said that the affection might be cured by the removal of the gland, but still the method was not infallible; when a nerve is injured, or organically changed in any part, the patient can feel the pain at the extremity. In this instance, he said he would practise another operation, the subcutaneous section of the nerves going to the gland; it is more simple than the amputation; there is less danger accompanying it—no suppuration, no erysipelas, and not so much deformity results.

Two subcutaneous incisions were made, one on each side of the gland; the pectoral muscle was divided to quite a great extent. Chloroform was administered to the patient, and while the operation was going on, he suddenly became like a corpse;

the body was colorless, and there was interruption of the circulation, and of the respiration. The pillows were pulled from under his head, and the inferior part of the body was elevated, so as to make the blood fall into the head, and the patient immediately revived. M. Nélaton said it was the second time that this had happened to him in the administration of chloroform, and in both, he succeeded in reviving the patient by this means alone. The aspersion of cold water, the application of irritating substances to the nose, &c. &c., cannot affect one perfectly insensible. As to the result of the operation, for the first few days, something appeared to have been obtained by it; there was still pain, when the indurated part was pressed upon, but nothing in comparison with what there had been; it afterward, however, became as painful as ever; the subcutaneous section of the nerves had completely failed, and twenty-four days after this first operation for the relief of the patient, the mammary gland was extirpated. The wound soon healed, and the patient went away cured.

Inflammations of the Mammary Glands.

February, 1853. A young woman entered the wards, on account of an abscess of her right breast. The end of the nipple was badly formed; she had tried to give it to her child to suckle, and after very many efforts, a cleft (chap) was provoked, that became very sore. Eleven days after her delivery, she was suddenly attacked with pains in the breast, after that by a chill, followed by fever, and by perspiration. When she came into the wards, there were evident signs of a purulent collection in the breast. It is taught, everywhere, that an impression of cold is the great cause of these abscesses, but M. Nélaton said that, in all cases where he had sought to determine exactly if it were exposure to cold, he found it was nothing of the kind; he never had seen this cause determine a mammary abscess. He found, however, another cause, and it existed in this case, a chap on the nipple, and, in his belief, it is this that determines the phlegmonous inflammation. Every day the surgeon sees a patient with a small wound of the foot, or of the hand, and the small ganglions all inflamed between it and a phlegmon. In this instance, he thought the affection to be only one of this kind, an angeioleucitis; and the anatomical disposition of parts comes to support this notion. Almost all the lymphatics take their rise in the nipple and the areola, and go into the partitions between the glandular tissue; and it seems as if the inflammation propagated itself in radii, just as the lymphatics are in radii. M. Nélaton said he was not perfectly satisfied, as to the correctness of this doctrine, but he thought he was right.

There was another important thing to notice in this case: forty-eight hours after the abscess had been opened, a large quantity of blood became mixed with the pus discharged. Whenever this phenomenon is observed in an abscess, the surgeon may be sure that there is another abscess in the neighborhood, and it is it that causes the flow of blood to the part. This fact is very important in abscesses of the buttocks, and of other deep parts, difficult to explore; this sign will reveal the existence of another abscess, and by an early opening, much suffering may be saved to the patient.

In order to open the large abscess, which the patient had when she came in, M. Nélaton waited as long as he could, and then made but a small puncture, and into its lower portion. Some surgeons give just the contrary advice, to open early, and by a large incision; but by retarding the opening, you do not have those crooked, winding connections to the abscess; there is but one sac, vast, but regular. In spite of the size of the suppurating surface, M. Nélaton thought it would soon be closed, when, as has been remarked upon above, a new abscess formed in the neighborhood; when this was opened, cicatrization took place with extreme rapidity. There are some abscesses, whose sides have a great tendency to unite; and those of the breast are among the number. M. Nélaton said he could not call the attention of the class too much to these abscesses; be slow in opening them, and then do it in the inferior portion.

The patient left the hospital, cured, at the end of two weeks, and for several days previous to her going out, only milk, that came from an opened galactiferous tube, flowed from the opening.

December, 1853. A woman, who had recently been delivered. When she tried to suckle her child, she had difficulty with her excellent health; twenty years before, she had had a child, but, in suckling it, had never had any difficulty in either breast.

Towards the superior part of the right breast there was a tumor, five centimetres, or two inches, in diameter, flattened antero-posteriorly, so as to have a thickness of but two centimetres. This tumor was very movable; the skin above it could be raised with the greatest facility, and it could be moved backward and forward over the more deeply seated tissues; to the touch, it gave the sensation of a very hard body, and it was nearly equally hard throughout. The neighboring parts were healthy; the glands in the axilla could be felt to exist, but they were not hard; their consistence was perfectly normal, and they were not painful; moreover, those in the left armpit were of greater size than those in the right.

Was this tumor benignant, or was it scirrhous? If the latter, it would most certainly have determined the retraction of the nipple; the projection of the nipple would be rather replaced by a depression, and the surgeon should know that this is one of the very first signs of scirrhus. The cause of this phenomenon is, most probably, the shortening of the galactiferous canals that go to the nipple. Moreover, scirrhus determines very quickly an adhesion with the integuments, and also very promptly an enlargement of the lymphatic glands in the axilla. Another sign of very great importance was the fact, that in this case there were no pains; if pains are absent in cancer, it is in the encephaloid. M. Nélaton said he thought it to be a simple partial hypertrophy of the gland, a fibrous tumor, though from its hardness, and its perfect circumscription, he had some inclination to think it might be a chondroma. As reasons for its removal, he gave the constant preoccupation of the patient, who was very much alarmed about it, and the fact that it might increase in size.

This tumor was found, after its extirpation, to be a tumor resulting from the hypertrophy of the tissue of the gland, and the microscope confirmed the diagnosis; it was a simple hypertrophic tumor, only there was a good deal of fat in its composition.

The woman recovered without anything remarkable.

April, 1854. A young woman, thirty-three years of age, who never had had any children, and was always regular in her menses. For the last five years she had been in feeble health, and, at the same time, in the right breast, a small tumor had made its appearance. This tumor was situated just under the nipple; it had the shape, and not quite the size of the little finger; it was very superficially placed, and was very movable, not only with respect to the skin, but also with respect to the parts beneath. The skin was exempt from alteration, and there was no complication of the ganglions. The patient said the tumor was sometimes painful, and sometimes not, but she was constantly very much worried by it; and, moreover, it appeared that her sister had been operated upon five years before for a similar tumor, and had been very happy ever since. This tumor was a type of the chronic mammary tumor of Sir Astley Cooper; small, immediately under the integuments, extremely movable, and enchased, so to speak, in a depression of the gland. Moreover, Cooper says that such tumors chiefly show themselves in women with disordered menstruation, and although this woman said she was well in this respect, she said, also, that the discharge was very pale, nearly colorless. It should also be added, that when the patient moved her arm a great deal, the tumor became particularly painful, and also at the period of menstruation.

These tumors exist indefinitely; there is no augmentation of volume, and, above all, there is no degeneration; but M. Nélaton said, *no tumor is ever transformed.* They may disappear by change of diet, and of livelihood, and again, by pregnancy and lactation. As a general rule, the surgeon should not operate in such cases, but this patient was so very uneasy, and said her sister had been so very happy since her operation, that M. Nélaton consented.

The tumor was white, of a fibrous appearance, and under the microscope presented only the normal elements of the gland. Cruveilhier calls these tumors fibroid, and Velpeau makes of them one variety of adenoid tumors.

The wound soon closed, and the woman left the wards highly pleased at being freed of her affection.

July, 1852. A young woman entered the wards, laboring under an affection that is quite often met with. In the right in the hope that she would change her mind, but she left without being willing to submit; she was satisfied with knowing that it was not cancer.

January, 1854. A woman, fifty years of age, entered for a tumor of the breast. She had had several children, and always had suckled them herself, and without difficulty. This tumor had commenced to manifest itself ten years before; it was then deeply concealed in the breast, but had become developed, had approached the skin, and formed a projection near the nipple. At this time M. Nélaton had seen her; there was then, evidently, a sac containing liquid, for which he advised a puncture, and the injection of iodine. This was done, but not properly, for the cyst reappeared. She came again to M. Nélaton, and he opened the cyst, and allowed a limpid serum, holding cholesterine in suspension, to escape; at the same time he observed that several other cysts were developed in the neighborhood.

At the time of her entrance into the wards, a disquieting symptom showed itself; there was an adherence between the skin and the cyst, and a *very* hard body was felt beneath it; the nipple was retracted, slightly so, it is true, but sufficiently so as to be easily perceptible.[1] The part of the areola between the nipple and the cyst, which was situated about two centimetres or nearly an inch above the nipple, seemed to be slightly depressed. There were no axillary ganglions to be percieved. M. Nélaton said that here there were evidently cysts, and moreover a scirrhous degeneration, a bad word, for there is no such thing as transformation of tissue, but it expresses what is meant. The irritating injection thrown into the cyst, might have caused sufficient inflammation to produce the adhesion of the skin to the sac; this was very possible; but the retraction of the nipple is not thus to be explained. It is not rare to find cystic and cancerous tumors together.

As to the treatment of the case, M. Nélaton said he must do that which would give the patient the best chance, and he would cut out the whole.

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[1] It has been said from time immemorial, and all surgeons have admitted, that retraction of the nipple, in tumors of the breast, is a pathognomonic sign of the existence of scirrhus. There is, however, a form of hypertrophy of the mammary gland, in which this retraction is very marked, and which consists in an exaggerated development of the glandular cul-de-sac with atrophy of the excretory ducts, which fact accounts for the appearance assumed by the diseased gland.

Upon examining the mass after its removal, it was found to contain a number of small tumors of an hydatid appearance, but they were not really hydatids. When these cysts were laid open, they were found to contain a limpid serum, like that of hydrocele. When the one, at the part of adhesion to the skin was opened, a liquid like milk came away, but which M. Nélaton said he supposed to be purulent. The rest of the mass consisted of adipose and cellular tissue, all remarkably hard. Under the microscope, this tumor was found to contain none but the normal elements of the gland; the milk-like fluid in one of the cysts contained bodies peculiar to colostrum.

The wound soon closed, and the woman left the hospital.

November, 1853. A woman, fifty-one years of age, and of a healthy appearance. Three years before, she commenced to observe something wrong in her right breast, but was not at all uneasy about it. She noticed that the nipple was retracted, and at last became depressed; alongside of it a small tumor formed, that gave her a great deal of pain, and became gradually larger. She had never undergone any treatment.

When she entered the wards, the breast of the right side presented a retraction of the nipple, the nipple itself being perfectly healthy; alongside of it was a tumor, forming a slight projection externally, its greater diameter corresponding to a radius drawn from the nipple to the circumference of the gland. This tumor was the size of a hen's egg; it was quite regular, with a few points harder than the rest; as to its consistence, there was a slight sensation of fluctuation, but not a frank one; it was like something hard, the kind found in cysts when very full, or in tissue not completely softened. There was a slight adhesion of the skin; in the axilla there was nothing to be noticed.

This tumor was one of three things; an encephaloid, the encysted variety; a cyst of the breast; or, thirdly, a chronic abscess of the breast. The last it could scarcely be, for they are generally developed deeply; an abscess so near the surface would have already opened of itself; and, moreover, no matter how old they may be, even two or three years after their development, they are always painful to the touch. Here there was no pain to the touch; and this, together with its superficial situation, made M. Nélaton conclude it was not an abscess. Between the other affections the diagnosis was very difficult. There were symptoms common to both affections; a tumor perfectly circumscribed; nothing in the axilla, for in encephaloid disease of the breast, the glands are very slowly affected; very slight adherence of the skin, and it is well known that encysted encephaloid continues a long time without determining any; and the retraction of the nipple exists no more in one case than in the other. The pains the patient said she had experienced at different times, she compared to prickings with a pin; but this, reputed to be a sign of encephaloid disease, is not so, and the surgeon must not conclude from them that it exists. The tumor had lasted a long time, and, as a general rule, encephaloid affections progress more rapidly, and become more voluminous. If then the character of the pains would lead the surgeon to incline towards encephaloid, on the other hand, the slowness of the growth would lead him in the contrary direction. M. Nélaton said he was in doubt, and asked if it might not be both, for you can have them simultaneously, as Sir Astley Cooper says; he thought, therefore, it was a cyst, with degeneration of the walls. In either case he ought to operate, for if even but a simple cyst, they can acquire an enormous size; after having remained stationary for years, they suddenly become as large as the head of an adult.

Upon examination, after its removal, he found the tumor to be a cyst, as he had supposed, and with degenerated walls. From the interior a kind of liquid, like a decoction of coffee, ran out when it was cut open. Under the microscope no cancerous elements were to be found in what M. Nélaton calls the degenerated walls. The edges of the wound were brought together, and a simple dressing applied. The next day so much blood had accumulated, that they were forced to open and let it out. This blood was very fetid, and the patient complained of feeling badly. Always, when fetid blood remains in a wound, the commencement of the symptoms of putrid infection is seen. The wound was largely opened, and washed repeatedly with a solution of chloride of soda.

The woman went out, in the course of a few weeks, with the wound entirely healed.

Cancer of the Mammary Gland.

November, 1852. A woman, forty-five years of age, with a tumor of the mammary gland, of which she gave the following history. Six or eight months before her entrance, she commenced to suffer at the extremity of the nipple; there was smarting; the epidermis disappeared, small blisters formed; in short, there was eczema of the nipple. This ulceration, at first superficial, extended and covered the whole nipple, and, after some time, the breast became hard.

When she came into the wards, there was induration of the mammary gland; the nipple was not retracted; and the gland itself was perfectly movable, both as respects the skin and the subjacent parts; and yet, the tumor seemed to be very near the skin, a condition favorable to the formation of adherences. When the pectoral muscle was made to contract, the tumor could still be moved perfectly well. The tumor, however, was very hard and lumpy; the hardness was cartilaginous, and it extended throughout the whole mass. The ganglions in the axilla were hard, and enlarged; they were not painful to the touch.

The first idea in regard to this tumor was that it was cancerous; and yet, the usual circumstances did not exist. The retraction of the nipple was wanting, and also there were no adherences with the skin, in spite of the existence of circumstances favorable to their formation. Since he had been in practice, M. Nélaton said he had never seen a case of cancer without one or the other of these things. He asked himself if the affection had not arisen from the ulceration on the nipple; as an affection of the testicle follows an affection of the urethra, so this glandular affection might follow that of the nipple. As to the glands in the armpit, they are often seen everywhere where there is an inflammatory action. The question was still too new to be answered, and M. Nélaton thought it to be his duty to cut out the tumor; if not a cancer, so much the better.

Upon examination after its removal, M. Nélaton said the tumor was evidently a cancer, in spite of the absence of the signs of which he spoke. The mass was very hard, and in the galactiferous ducts was a gray matter; the tumor, he said, was evidently scirrhous, and the ducts were also affected; the glands also presented evident marks of degeneration. To explain the absence of adhesion to the skin, something was found; the cancerous degeneration was deeply seated, reposing on the pectoral muscles; and there was a portion remaining healthy, towards the surface. No microscopical examination, so far as I know of, was made of this tumor. This patient got well without any bad symptom, and she went out with the wound entirely closed; but M. Nélaton said a relapse was probable.

March, 1854. There were, at this time, two cancers of the mammary gland in the wards, one of rapid march, the other very slow.

One patient was an old woman, sixty-seven years of age, and very feeble. She said that six or seven years before, she commenced to suffer in the left breast, and she was unable to give any more precise information than that. This M. Nélaton did not think was the real commencement of the disease, for it might have existed long before it gave her any uneasiness, and this was a very important point in the case. He would take, however, seven years as the duration of the affection; and this long duration is its peculiar characteristic. The patient had not been much incommoded by the affection until lately, when she had pains in the part, which she compared to the prickings of a needle. Alongside of her nose was a cancroid affection, and it was this, and not the affection in her breast, that had induced her to enter the hospital.

The left breast was found to be very small, about the size of a nut cut in two, irregular on its surface, and surmounted by the nipple, rather larger than usual, but not retracted, for it had no place to go to. The skin covering the gland was wrinkled, doubled on itself; there was one point where it was rosy and smooth, and near that point it adhered. The tumor was adherent to the neighboring parts; when the pectoral muscle contracted, there was no motion. The glands in the axilla were unaltered.

The affection had lasted for seven years, and was but slightly painful; the patient was sixty-seven years of age, a very important fact, for it was the senile cancer, the atrophic cancer, the cancer determining atrophy, shrivelling of the gland, and yet does not threaten ulceration.

This form of cancer is not exceedingly rare. They can remain much longer without any accident; M. Nélaton has seen them last for twenty years without causing much pain, or any swelling of the ganglions. If the patient has sense enough to let it alone, it can last thus very long, and this fact should teach the surgeon he should do nothing, or if the patient is very urgent, he can pretend to do something, but he should never operate to remove it.

There is another form of chronic cancer seen, likewise in old persons. In the breast you will find a tumor, forming there a hemispherical projection; sometimes, as it were, pediculated. Their appearance is very peculiar: they are red, deeply so, and smooth on the surface; they have been compared to red potatoes deprived of the skin, and the comparison is quite exact. They are very hard, and completely indolent; they cause no swelling of the lymphatics, and constitute rather a deformity than a disease. These cancers come under the same category as the others, in the sense that you must not touch them.

There was, at the same time, in the wards, a form of mammary cancer of an opposite character. The patient was forty years of age, and said a tumor commenced to develop itself in the interior of the breast, just one year before, and it had, since then, been growing very rapidly.

When she came in, there was a large mass, thick, and very hard, in the right breast. The skin presented profound alterations; it was felt to be thicker than natural, and less easily separated from the deeper parts, and, upon close inspection, a crowd of small depressions were seen on its surface; it looked as if there were a multitude of very small adhesions, which caused this appearance. In this case, moreover, the color was changed —it was rosy; in many patients this is not found.

This is the most unfavorable form of cancer of the breast. It is often found to occur in young persons; its progress is extremely rapid; in five or six months you often see all parts invaded by the disease—skin, cellular tissue, the whole gland, and the lymphatic ganglions. It is very rarely limited to a single breast, and the skin is invaded all over, to the other breast that is seized, so as to form a kind of cuirass. Even if you do operate when only one breast is attacked, you have generally a relapse, and before cicatrization is accomplished. You must never operate in these cases, for whatever you do, you will have a relapse.

There is one thing, this cancer is not very painful; in this case, in spite of the size, there was no pain. Two months before, a woman had died in the wards from the same affection; she died from hemorrhage, but, to the last moment, she said she scarcely suffered.

In this case, M. Nélaton said there was really nothing to be done for the cure of the affection, but he would pretend to do something, in order to prevent her falling into the hands of rascals.

December, 1853. M. Nélaton removed what he called a *relapsed cancer*, from the breast of a woman who had been operated upon six months before, at Calais. The extirpated mass was translucid, resembling *colloid tissue*, M. Nélaton said. It was a question, he remarked, whether this disease, as it is not *frankly* cancer, exposes the patient laboring under it as much to a relapse as cancer does? He was unable to answer it himself, but certainly it does not do so to a greater degree.

M. Robin called the tumor *fibro-plastic.*

M. Lebert was the first to describe, under the name of *fibro-plastic*, a peculiar anatomical element, which is normally found as an accessory constituent part, in every tissue, where fibres of cellular tissue are found, and also in the marrow of bones. It is an element found more abundantly in the fœtus than in the adult, but it is not true that it is the fibre of cellular tissue in the process of development, in an embryonic condition; it is not metamorphosed into fibres of any kind.

This accessory element, by hypergenesis, may pass to the condition of principal element, and the new, but homœomorphous tissue resulting, is called fibro-plastic tissue. It presents itself generally under the form of tumor, or of induration. Whenever there is chronic inflammation, and ulceration of a tissue, it is found more abundantly than in the normal condition.

The fibro-plastic element presents three varieties, two of which, the nuclei and fusiform bodies, constantly coexist; and when the third, the cell, is found, the two others constantly accompany it, in greater or less quantity. These varieties are free, ovoid nuclei; cells, generally ovoid, but chiefly characterized by a nucleus like the free one; and, thirdly, fusiform bodies, which also contain a nucleus like the free one. The fixed character of the element, therefore, is the nucleus; and the free nuclei are always more abundant than either of the other two varieties. The cells are quite rare, and, in the normal condition, are only found in the Graafian vesicle.

These nuclei are ovoid, generally regularly so, though in some cases they are a little undulated; they are from 0.009 millimetre to 0.010 millimetre, or $\frac{1}{2500}$ inch in length, and from 0.005 millimetre to 0.006 millimetre in breadth. It is important to notice these dimensions, for those of cancer are much greater. They are, generally, rather transparent, and never yellowish, or so dark as the nuclei are in cancer. They are more transparent in tumors of rapid growth than when the tissue is firm; they are very transparent, for instance, in the tumefaction about a white swelling. They are insoluble in acetic acid, which renders their contour more distinct, and at the same time less regular, which is just the contrary of what is seen in cancer. These nuclei consist of a homogeneous mass, very finely granular, sometimes containing a nucleolus, and sometimes even two, but they are always very small.

The *cells* are generally ovoid, rarely entirely spherical; they most commonly have their edges somewhat irregular; when very many are together, they can compress each other so as to take a polyhedric form. *In all cases, it is structure, more than form, that characterizes a cell.* It is more transparent than most other cells, in fact, with the exception of some epithelial cells, it is the most so. Acetic acid renders the mass of the cell around the nucleus more transparent, and at last dissolves it entirely. In cases where there may be any doubt, the use of acetic acid is very important, for the nucleus can thus be set free. This nucleus within the cell is entirely similar to the free one, and the mass around is homogeneous, and finally granular. These cells are found quite often in colloid, or gelatiniform tumors, and they have been called cancerous, even by persons aided by the microscope in their investigations, from finding within them a cell that evidently was not epithelial.

The *fusiform bodies* are very easily distinguished. They are long bodies, swollen in the centre, where a nucleus, exactly similar to the free nuclei, is placed, and which has the appearance of causing this swelling by its presence. The extremities are more or less tapering; sometimes one of them appears as if truncated. As these bodies are very soft, they are generally curved upon themselves. Between the nucleus and the edges, are grayish granulations, which are mostly situated near to the nucleus. From being examined with too low a magnifying power, these fusiform bodies have been confounded with fusiform cancer-cells; as said before, the structure of a cell is of more importance than the form.

Any tissue, that has for its fundamental element the fibroplastic, is called fibro-plastic tissue; as an accidental production, it always presents itself under the form of tumors. Three varieties of these tumors are distinguished, as the nuclei, the cells, or the fusiform bodies, predominate in their composition. When the fusiform bodies predominate, they are generally reddish, and of *sarcomatous* consistence; when the nuclei, or cells, predominate, they often are *colloid* or *gelatiniform*.

The *colloid* appearance of a tumor is due to a deposit of semitransparent, homogeneous, amorphous matter, resembling jelly, between the characteristic elements of the morbid tissue, which are thus kept separated from each other by this amorphous matter. This matter separating the fundamental elements of the tissues, gives its semi-transparency to the whole morbid product, although these elements may be opaque, or nearly so, when they are assembled together. This colloid appearance is found in tumors that have for basis fibres of cellular tissue, mingled with fibro-plastic elements; in fibro-plastic tumors, properly so called; and in many hypertrophic glandular tumors. *It has never been seen in any tumor that contained the specific elements of cancer.* Certain hypertrophies of the glands, *en grappes*, formed chiefly by hypertrophy of the very pale epitheliums, accompanied by more or less amorphous matter, have sometimes the colloid appearance. This is the case when hypertrophied portions of the gland, portions, some lobes of which are sometimes composed principally of amorphous matter, and of fibro-plastic elements, project into cysts from the centre of the tumor, as in what Sir Astley Cooper calls *hydatiform cystic tumors of the mammary gland.*

Glandular hypertrophies, or *hypertrophic glandular tumors*, are tumors characterized, anatomically, by having for their essential element, the elements of the glands wherein they are found. Of course, therefore, their nature can only be recognized by a previous acquaintance with the normal structure of the secreting organ. They are often met with in the mammary gland, and, in fact, they form a group of tumors more often observed, perhaps, than any other. It has, in fact, been proved by observation, that the great part of the alterations of the tissues and of the organs, have for their origin a certain element, which has augmented or diminished in quantity, and thus deranged the disposition of the others, or even caused the disappearance of a part of them by atrophy.

These tumors vary in exterior aspect, according to the kind of gland affected. They can, moreover, in the same gland, offer different appearances, according to the portion chiefly affected; for all the elements may be augmented in quantity about equally; or, it may be, the glandular cul-de-sac, or the closed vesicles, which have augmented in volume; or the walls of the cul-de-sac may have become thicker; or, and this is the most frequent, the glandular epitheliums may have increased in quantity and in size. The exterior aspect of glandular tumors is frequently modified by the production, among the glandular elements, of a jelly-like amorphous matter, by deposits of yellowish, or whitish, fatty granulations, and even by the development of adipose vesicles. It may be remarked, also, that always, when the amorphous matter is abundant, hemorrhagic effusions are found here and there in the mass.

These various forms of glandular hypertrophies can be attached to three principal varieties, founded upon their structure. Many more could be made, for two are never found alike; some, however, are more striking than the others.

The first variety is characterized chiefly by hypertrophy of the walls of the culs-de-sac, and atrophy of the excretory duct. The tumor is gray, semi-transparent, and contains a liquid, viscous and transparent. Under the microscope, the walls of the culs-de-sac are found to have become very clearly striated. The tumor often becomes encysted, that is to say, limited or surrounded by a layer of cellular tissue. When the affection of the gland is but partial, the excretory duct at last may become entirely atrophied, and the hypertrophied portion finally becomes entirely encysted. Encysted tumors formed in this way have been quite often met with in the salivary glands. Those mammary glands that are sometimes seen, weighing sometimes as much as ten pounds, are often composed of this variety of glandular hypertrophy. In such tumors, you sometimes find colostrum, but never milk.

The second variety is more important, for it is more common: and, moreover, it may become a more serious affection, as the starting point of a cancroid, or epithelial tumor. In this variety, the epithelium accumulates in the culs-de-sac, and distends them, until, finally, the walls may be absorbed, and the epithelium is infiltrated into the neighboring tissues, which also are atrophied and destroyed, with the exception, however, of the elastic tissue, which always remains in the form of yellowish ramified filaments in the diseased tissue.[1]

In the third variety, the accessory elements of the gland are hypertrophied, and the tumor formed has the appearance of a fibrous tumor. Here and there, in the mass, a few hypertrophied acini may be found that have become cysts, but everywhere else the acini are atrophied.

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[1] See page 471, Cancroid.

CHAPTER XVIII.

TUMORS IN THE ABDOMEN.

Cyst of the Ovary.

FEBRUARY, 1853. A young woman, nineteen years of age, entered the wards, being sent there as affected with an ovarian cyst.

She said it was fourteen months since she had had her menses, and before that time they had always been very regular. From that time she had noticed her abdomen to be growing larger and larger. She became uneasy about herself, and, after some time had elapsed, consulted a physician, who told her she had a tumor of the ovary.

At the time of her entrance, there was a tumor extending beyond the umbilicus, fluctuating, and dull upon percussion; the intestines were placed behind it; all these are signs of an ovarian tumor. The neck of the uterus was situated very high up; it was small, and presented a remarkable softness, a sign of much importance.

There have been so many errors committed in cases like these, that it is necessary to be very careful and guarded in the diagnosis; so much the more so, as that the patient, in this case, was young, and ovarian tumors are very rare before the age of thirty.

Upon auscultating over the abdomen, the noise of the fœtal heart was distinctly audible; there was manifestly a fœtus there. The determination of this fact could not, however, explain all the phenomena in this case, and it could very well be supposed that the woman had become pregnant during the continuation of the affection of the ovary.

Four years before, M. Nélaton related, he had been called to see a young woman, who thought herself pregnant. She had already consulted—the names may be given, for every one can be deceived—Jobert, Velpeau, Recamier, and Amussat, and they all, as well as himself, thought she had a fibrous tumor of the uterus. Some months afterward, still continuing to believe herself pregnant, she consulted M. Huguier, who found *ballottement;* and in a few months she was delivered of a child. But, as was apparent after the delivery, she had had, at the same time with her child, a fibrous tumor of the uterus.

In the present instance, if, after her delivery, an ovarian tumor should be found, it would be time then to do all that might be necessary.

This patient left the wards, and never presented herself again.

November, 1853. A woman, thirty-one years of age. She had been *enceinte* three years before, and neither pregnancy nor delivery had been attended by anything unusual. Fifteen months after the birth of the child, she commenced to find her abdomen increase in size, and believed herself again *enceinte;* as she was then nursing her child, and not menstruating, she could readily have thought so. A physician, however, whom she consulted, told her she was mistaken—that it was something else.

One month before entering the hospital, she had consulted a physician, who introduced a trocar, and drew away twenty-five quarts of liquid. After this tapping, no tumor could be detected in the abdomen, and the physician said the liquid had been contained in a sac with very thin walls. Fifteen days after the water had been drawn off, she was again very large; and she came into the hospital to demand something for her permanent relief.

After having examined the patient, M. Nélaton said there could be no doubt as to its being a cyst of the ovary. The surgeons of the past century, when a cyst of the ovary filled the abdomen, could not distinguish it from ascites; at the present day, nothing is more easy. When the cyst is not very large, there is no possibility of confounding the two affections, for percussion tells at once which it is. In ascites, the liquid is in the peritoneum, at first only in the pelvis, and the intestines float above it; all this is most easily determined. When there is an encysted tumor of the ovary, it comes gradually; and as it goes up in the abdomen, it ascends in front of the intestines; it is, as it were, in equilibrium on the vertebral column, and vast as it may be, by percussion, sonority will always be found in the lumbar region. Some circumstances, as a collection so enormous that the mesentery is not sufficiently long to enable the intestines to float on the surface, or adherences of the intestines, or want of gases therein, might cause error; but these are so rare, that M. Nélaton had never seen them cause any mistake; the commemoratives, symptoms of peritonitis, &c., explain the difficulty. In this case, there was dulness in the umbilical region, and sonority in the lumbar; the diagnosis was cyst of the ovary. It is a diagnosis, however, to be mistrusted; for there may be simultaneous pregnancy, of the coexistence of which the surgeon should always inform himself, and never permit himself to be surprised by finding.

The prognosis of this affection, M. Nélaton said, was most grave. It is not so in all cases of cyst of the ovary; but in this one it was, for the disease marched with frightful rapidity. Only fifteen months after its commencement, an enormous amount of liquid had been removed; and not only that, the effusion was then so terribly rapid, that, at the expiration of but four weeks, there was as much as there had been before. In such a case as this, if the surgeon limited himself to drawing off the water as it collected, the patient would soon be exhausted. This is not the rule in these cases; generally, many years elapse, and the wearing out of the patient happens slowly.

In the presence of such a case as this, ought not the surgeon to do something? M. Nélaton said that, some years before, many questions would have had to be discussed; but, within two or three years, the whole question had changed, so that but the one question now occupied him—how iodine injections would answer in so large a cavity.

The operation has been practised in two ways: by previously establishing adherences between the walls of the abdomen and the cyst, and without doing so. It has already been tried in a sufficient number of cases to permit of some conclusions being drawn. Contrary to all expectations, it is not peritonitis that takes place, to cause death. Some cases have resulted happily; and M. Nélaton said he would present, the next day, a table of all the cases. He thought he would operate in this case: the tincture to three of water. The quantity of course varies; about two pints would be used for this large sac. After it has been thrown in, it is pressed, so as to be brought in contact with every portion of the surface, and at the expiration of five or six minutes allowed to come out. If it will not flow out, the surgeon need not feel alarmed, for it has often been left in, and no harm has resulted.

M. Nélaton drew away a clear, transparent liquid, with a small trocar, and then made an injection of about fifteen ounces, of which one-third was the tincture of iodine. After the injection had been pushed in all directions, for five minutes, it was made to come out, and a similar injection at once repeated. The injection was made to come out with some difficulty, and about one-half remained in. The patient complained very much, and a notable change took place in her; she became cold and cyanosed, her pulse became small, and it was with difficulty she could be made to hear. This condition continued long after she was carried to bed. Throughout the whole of that day, and the day following, she appeared to suffer very much, vomiting almost constantly; a striking phenomenon was the excessive thirst. There was no evident sign of peritonitis; over the abdomen there was but little soreness, every region was felt, and she did not accuse M. Nélaton of hurting her.

Although the circumstances that may deceive the surgeon in the diagnosis of these cases, such as adherences, absence of gas, and enormous distension, are very rare, yet the aspect of the liquid, and the absence of any sac, made M. Nélaton doubt as to whether the case might not be one of ascites. He did not hesitate however, to make the injection. In the Society of Surgery are the reports of fifteen cases of ascites in which this operation has been performed, and of these, four died. No doubt there are many more fatal cases, that have never been reported. The successful cases were from the country, and of course the same good result was not to be hoped for in a great city like Paris.

The reproduction of the effusion took place with frightful rapidity; even on the evening of the operation the belly was already raised up, and the third day there were at least sixteen pints of fluid accumulated. It was a true serous hemorrhage. The patient, on the third day, however, was better; her lips were red, and her pulse, which had been irregular and intermittent before the operation, was better than it had been at all since her entrance into the wards.

She continued to get better, and on the seventh day of the operation, with the exception always of the irregularity of the pulse, she seemed pretty well. There was no pain over the abdomen, and the swelling, to say the least, had not increased. She desired to sit up, as if to breathe more easily; the chest was examined when in that position, and the only abnormal sounds were those of the heart. Asking for food, soup, chicken, and fried salsify were given to her. The *interne* found her in a good condition at eight in the evening; at two in the morning he was called, and found her dying.

At the autopsy, on opening the abdomen, an immense false membrane was found, so disposed as to be continuous with the abdominal walls in the pubic region, and above to be adherent to the transverse colon. Beneath that were the intestines glued together by plastic lymph. There had then existed a circumscribed effusion, bounded before by this false membrane and behind by the intestines glued together. Such a condition, of course, would produce identity of symptoms, with those of a cyst of the ovary. There was no pus in the abdomen, and M. Nélaton said he did not believe that death had resulted from anything in the abdomen. As had been foreseen, there was a lesion of the heart; it was enormous, and, excepting the point, adherent to the pericardium. There was an enormous dilatation of the left auricle; M. Nélaton put his whole fist into it, saying he had never seen one so large. At the same time there was cirrhosis of the liver. The ovaries were enlarged, hard, and full of small cysts. It seems more rational to attribute the death of this patient to the affection of the heart, than to the plastic inflammation of the peritoneum.

Hydatid Cyst of the Liver.

November, 1851. A man, forty-nine years of age, and having the appearance of enjoying excellent health. Nine years before his entrance into the hospital, he experienced pain in the right hypochondrium, for which he was bled, with much relief. Four months afterward he had the same pain, for which the bleeding was repeated with the same result, and again six months after that. In the month of January, 1850, he entered the hospital Beaujon, on account of a tumor, that had made its appearance in the right hypochondrium. The puncture of this tumor was made, and a liquid, perfectly clear, was extracted. After the evacuation of the liquid, the tumor in a great measure disappeared, but never entirely.

When he entered, there was a tumor in the right hypochondrium, extremely voluminous and firm, yet there was fluctuation. There was no mistaking the hydatic *frémissement*, a sort of vibration that prolongs itself quite a long time after the blow. The man was stout, he had never been jaundiced, he had no trouble in his digestive organs, none in his respiration, and none in his urinary passages.

M. Nélaton said there was good reason for admitting the existence of a tumor of the liver, but it was not altogether certain. The fluid of hydatids is limpid as water itself. The acephalocysts are sacs, generally perfectly globular, on the internal surface of which is seen a powder, resembling white sand. This powder is composed of echinocoques, very minute animals, ovoid, with a constriction at their middle portion, so that they are divided into an anterior part, the head, and a posterior part, the caudal bladder. The head is sometimes within the caudal portion, and sometimes pushed out. This retractile head is armed with a double crown of radiated hooks, and provided with four suckers.

Quite often there are also several small cysts contained in the mother cysts, and it is only when such is the case, that the *frémissement*, before spoken of, is felt upon percussion. Being extremely movable, when a blow is given to the whole mass, they are put in motion, and their agitation reacting upon the fluid around them, gives rise to the peculiar sensation.

The presence of such a tumor is a grave matter, it is mortal. Quite often they burst, generally into the peritoneum, though cases have been seen where this took place into the stomach, duodenum, colon, and various other portions of the intestines. At other times these tumors open exteriorly, but after this has taken place, what a vast sac of suppuration is left! The dangers for this patient, then, were great and numerous.

M. Nélaton decided then to open the cyst, previously causing its adherence to the walls of the abdomen, in order to prevent the effusion of the liquid into the peritoneum. This would be done by cauterization; Vienna paste would be applied, its scar excised, and this repeated, until, by successive cauterizations, the peritoneum would be reached. This, it was calculated, would require eight or ten days.

The establishment of the adherences by caustic, in the way just described, is preferable to the several other modes that have been employed. One method is to cut down to the peritoneum, and by the contact of the air, it inflames, and adherences are formed between this external layer and the one covering the tumors. Another method is to cut still further, incising in addition the peritoneum, which infallibly inflames and contracts adherences with the walls of the incision. M. Trousseau also made use of the puncture of needles, but the adherences thus made are very imperfect. In the same way M. Maisonneuve makes use of a thread, which he passes so as to fix the cyst to the walls of the abdomen. All these means have succeeded, and all have quite often failed.

After the adherences have been effected, so that there is no longer any danger of effusion into the peritoneal cavity, the cyst would be opened by the introduction of a trocar. After that time, the decomposition of the pus and its absorption are to be dreaded; but for this, injections of iodine, which modify the action which takes place, would be made use of.

On the fourth day after the first application of the caustic, the adhesions were sufficiently established to permit of the introduction of the trocar. The puncture was made into the opening, which was in the most elevated portion of the tumor, the patient being on his back. The liquid, as is always the case in these cases of hydatid cysts already punctured, was sero-purulent. When the cyst had been emptied as much as possible, an injection of thirteen fluidounces was made, of which one-third was tincture of iodine. Two such injections were made in succession, and it was impossible to make them come out again. A very little of the taste of iodine in the mouth was the only symptom of its presence in the economy afterward noted.

No sign of abdominal inflammation followed this treatment. On the afternoon of the second day, the man had a chill, that lasted an hour and a half, followed by fever and thirst. This paroxysm caused much alarm as a symptom of putrid infection, but there was no repetition of it. A gum-elastic catheter was left in the opening, and the sac through it was washed out twice every day with the injection of iodine. The discharge from the cavity was very great; on the sixth day of the puncture, when already diminishing, it amounted to four and a half pints of pus. When the injection was afterward made, there came out a mixture of pus and of tincture of iodine. If some pus be placed in a glass, and the tincture of iodine thown above, it does not mingle, it remains there; when placed below, it mingles for a time, and at last comes above.

The patient got thin, as can readily be understood from the discharge, but he had no grave symptoms. The discharge became gradually less and less, so that when the man left, at the end of about eight weeks, there was but a fistulous orifice, discharging a few drops of pus. Whether this fistula ever healed up, I do not know; and if it did persist, it was a trifle when compared with the affection from which he had been relieved.

February, 1853. A young woman, twenty-four years of age, entered the wards for an affection of the uterus. Upon examination, there was none found, at least none worthy of attention. The woman had the look of health, and she menstruated perfectly. The only disease found about her had its seat in the liver.

The patient said that, in the month of October, 1848, she was seized with a pain in the right side, so great as to force her to keep her bed. Leeches were applied over the region, and cataplasms afterward. At the time of this suffering she was not jaundiced. She got better, and, in December of the same year, she was married. Some months later, in July, while dressing herself with her cousin, it was observed that her right side was larger than the other. Soon after this she became *enceinte*, and everything both during pregnancy and delivery passed off most favorably. After the birth of the child, the deformity was still visible, but she never felt any pain there. She afterward had another child, when the presentation was unfavorable and the delivery attended with many difficulties.

When she came into the hospital, the hepatic, and all the neighboring regions, were enlarged, the antero-posterior diameter seemed very much increased, and every part was stretched. The edges of the costal cartilages were over the junction of the upper two-thirds with the lower one-third of this tumor. By percussion, commencing at the clavicle, sonority was found as far as the third rib, where absolute dulness commenced. This dulness extended downward as far as a line drawn transversely across the abdomen from the umbilicus, making a distance of fifteen centimetres, or six inches. On the left side, in front, there was a clear sound only in the most elevated portion of the chest, and on the side the same thing was ascertained. M. Nélaton tried to get the *frémissement*, lasting a long time, of the hydatid tumors, but it could not be detected.

Upon interrogating the principal functions, it was found that digestion took place with facility; there was no constipation, and there had never been any jaundice. For the organs contained in the chest it was different; her respiration was very much oppressed; she could only lie upon her right side, and with the head very elevated. As to the sensations experienced in the tumor, she had no pains, no prickings; there was only a sensation of weight, of heaviness.

The great volume of this tumor, its long-continued indolence, and its manifest fluctuations, made M. Nélaton say, without hesitation, that it was a tumor of the liver, and an hydatid tumor.

These hydatid tumors come in two forms: there is one single sac, or a mass of them. In the present instance, there was but one, for there was a flow of liquid from one end to the other, and, moreover, there was an absence of *frémissement*. The *frémissement* is owing to the small globular sacs moving against each other.

The question of what was to be done, was, however, the one of by far the greatest importance. The affection was making rapid progress, and if left to itself, the rupture of the sac can take place, as it generally does in these cases, and death follows in a wonderfully short space of time, from peritonitis. M. Nélaton related a case he remembered, that had occurred in the service of M. Chomel. It was a man with an enormous hydatid tumor of the liver, in whom an application of caustic potash had already been made, in order to establish adhesions, preparatory to the puncture of the cyst. The man siezed the cord, suspended in the centre of all hospital beds in Paris, in order to raise himself up; the cord broke, he struck himself violently upon the belly; intense pains followed, and he was dead in twenty-four hours. The force of the blow had ruptured the cyst, and its contents had been thrown into the abdominal cavity. Rupture of the cyst, by gradual thinning of the walls, is the usual termination of these cases, but sometimes the disease is seen to stop, the tumor grows less, and after death the cysts are found, all withered. This is observed chiefly in cases where there are small cysts. Sometimes, the sac surrounding the hydatid suppurates and opens; and sometimes there is peritonitis without suppuration, from a kind of continuation of inflammatory action from the sac.

There were ninety-nine chances out of a hundred, that the patient would die from her affection; but there was another question to answer, namely, when this would happen. This was a question that could not be answered; but the hydatid was only four years old, it was already enormous, and most probably the fatal termination would not be long delayed. The woman was but twenty-four years of age, and M. Nélaton thought some treatment should be tried for her relief, and said he would institute the same he had already made use of. When the simple puncture of these tumors is made, a colorless liquid, like distilled water, flows away. This liquid contains small grains, like white sand; what they are, is a question, but they are always present. Sometimes, after this simple puncture, the sacs inflame, the walls adhere, and a cure results. This is, however, very rare; most generally, an inflammation follows, so great as to prove fatal, either from the passage of the liquid into the peritoneum, or by putrid infection; generally by the former. In order to render himself secure from the one, the surgeon, therefore, previously causes the formation of adhesions, and from the other, by carefully and repeatedly washing out the cyst with injections containing iodine.

To excite these adhesions, some surgeons cut down and lay bare the external surface of the peritoneum, so that an inflammation may result, and glue its two layers together. The inflammatory action is not, however, always communicated, and the adhesion does not take place. It was proposed by another surgeon, to open the external layer, and he did it twice with success, but M. Nélaton said he had seen it twice performed by Bérard in order to establish adhesions—once in a cyst of the kidneys, and once in a cyst of the ovary, in a young girl; in both cases, a fatal peritonitis was developed in twenty-four hours. M. Trousseau had the idea of forming the adhesions, by planting some needles, in order to circumscribe the part he wished to inflame. An aid allowed one of the pins to fall into the cyst; intense inflammation followed, and death. So far as the establishment of the adhesions is concerned, the autopsy showed the operation to have succeeded. Recamier applied caustics on the walls of the abdomen, and, by them, a union of the parts is effected with certainty.

The adhesions having formed, the cyst must be opened, and this is sure to produce the inflammation of a sac holding three or four quarts of liquid; and the danger of such an inflammation every one is aware of. Of late years, however, the danger has been much diminished, by the introduction of the use of injections of iodine. The opening of the cyst, M. Nélaton said, he would make with a small trocar.

In the operation for the cure of hydrocele, the iodine is injected, made to come out again, and then the hole is closed. The cyst fills again, and then the liquid is absorbed, and all is well. In a case of hydatid cyst, however, it is different; when the sac is emptied, it tends to separate itself from the parts with which it is in contact; an eliminating inflammation arises in the cellular tissue around, that tends to eliminate the sac as a foreign body.

In regard to the point where the adhesions should be established, as the opening was to serve not only for the evacuation of the liquid there contained, but also for the pus which would afterward form, it ought to be made in the most inferior part of the tumor; but as the liver descended in the patient as far as the umbilicus, and when the sac was emptied it would tend to go up to its normal position, it would be necessary to take care and not cause the adhesions to form too low down. The thinnest, softest part of the tumor was one inch from the edge of the ribs, and corresponding to the external border of the rectus muscle of the abdomen, and this spot was chosen.

Vienna paste was applied, and the first application destroyed the skin and fatty cellular tissue underneath. Some more was applied upon the aponeurosis, and M. Nélaton said he would proceed thus, advancing more slowly, and as he came very near to the sac, he would place some foreign body in the opening to excite inflammation. The patient, of course, was kept in bed in order to avoid any sudden movement that might prevent the formation of adhesions. At the end of about three weeks, a hole, one inch in diameter, had been burned down nearly far enough with Vienna paste. The monohydric nitric acid was then made use of.

Having proceeded thus with slowness, at the end of a month, when he thought he had nearly got through the abdominal walls, M. Nélaton measured the distance still intervening to the cavity, with a cataract needle, and found there was still one centimetre to pass. This introduction was followed—whether it was the cause is not said—by symptoms of circumscribed peritonitis, and the patient was in great danger; the dyspnœa was extreme. Blisters, mercurial frictions, and opium, internally, were made use of in the treatment of this complication.

About two months after her entrance, she was so well that the puncture was made. The liquid, as was desired, flowed slowly away; at the end of an hour, two litres and twelve centilitres, or four and a half pints, were collected. The liquid was transparent, containing a very little pus, and those small grains like sand, believed to be hydatids. The patient appeared to be calmer, her pulse was better, and her breathing more easy. The canula became displaced and fell out; and when it was introduced the next day, about a pint and a half of liquid, slightly yellowish, as if containing the coloring matter of the bile, came away.

To combat the dangers of putrid infection, to modify the walls of the sac, and to produce its obliteration, injections of iodine were made use of. This injection was not made use of before forty-eight hours had elapsed after the puncture, when there was already a manifestly putrid odor in the liquid that was escaping, an odor that told the surgeon that an inflammatory process had already commenced, and that if nothing was done, the patient would die from putrid infection. This injection of f℥vij, contained one-fourth of the tincture. It was impossible to make it come out again. When such an injection is made into a hydrocele, a serous exhalation takes place that is afterward absorbed. When into a cold abscess, the absorption of the liquid does not take place, or so rarely so that it cannot be depended upon: it is a purulent liquid, and the abscess closes, little by little, after repeated injections. In hydatid cysts, things take place as in cold abscesses, and on this account the canula was left remaining in the cyst. The patient, at this time, appeared to be doing quite well: she had, however, a dry tongue, that was unfavorable, as indicating a vice of the digestive organs.

In the course of a few days, a diarrhœa commenced, and at the end of ten days, when M. Nélaton, on account of his health, was absent from Paris, the patient died, apparently from exhaustion. No autopsy was made.

February, 1854. There were, at the same time, in the wards, two cases of affection of the hepatic region.

One, a man, thirty-five years of age, formerly a tailor, but who, since then, had followed an occupation requiring more strength. He said he had all his life been subject to stitches in the side, but this is a term that can be applied to many pains; hepatic, pleuritic, or to pleurodynia. He always continued his work in spite of these pains. Once, after one of his stitches, he was jaundiced. It was important to know whether this jaundice had been without fever, as in organic diseases, or whether with fever, as in inflammation; it was difficult to judge from the patient's answers, but it seemed more probable that there had not been fever.

Three years before, he observed that a tumor had made its appearance in the hepatic region. He was at that time in Poitiers, and consulted M. Gaillard, a very capable man, who applied caustics, and then opened the tumor with a bistoury. A certain quantity of pus came out, and of pus *mixed with blood*. Abscesses of the liver, as is well known, furnish pus of a peculiar character like pus and blood; like pus mixed with the detritus of the organ; it resembles the lees of wine. The opening continued to furnish a discharge, that at last became pure pus; and it had never closed.

Midway between the side of the abdomen and the umbilicus, and one inch from the costal cartilages, there was a very narrow fistula, surrounded by an erythematous patch. Into this opening the patient introduced a sound, shaped like a female catheter, to a distance of nine centimetres, about three and a half inches, after which he said he could feel the tissues tearing. The direction of the fistula was very slightly oblique, upward and outward. By some management of the canula, a purulent liquid was made to come away, at times more opaque than at others.

The first impression, on hearing the patient relate that he came in for a fistula in such a situation, was, that there was caries of a rib. But, when the history of the case was known, the stitches in the side, the jaundice, the tumor in the hepatic region opened, the character of the pus discharged, the fistula was diagnosed as one evidently entering the liver. This was as far as he could go; whether there had been a hydatid there that had suppurated, or what had been the cause of the affection, M. Nélaton said he could not say. At all events, the patient was young, all his functions were good, and he thought something was to be done for him.

M. Nélaton said he did not think it would be impossible to bring about the occlusion of this cavity, and for this purpose injections of the tincture of iodine, even of the pure tincture, would be made use of. At first the discharge would be increased, but, under the irritating, modifying influence of such injections, a cure might be hoped for. In order to close this fistula, it was, above all, necessary not to allow the secretion to remain, on which account the fistula was enlarged, so that the liquid exhaled could easily flow away. This was commenced by the introduction of the root of gentian, and then sponge was made use of.

The fistula was dilated, and injections of iodine were made, the canula being kept constantly in the opening, in order that the pus might flow away.

This patient did not remain long enough in the wards to permit of the healing of his fistula, and I do not know what became of him.

The second case was a very handsome, well-made boy, fifteen years of age, who worked as a jeweller. The first he knew of his affection was fifteen months before, when he saw a tumor appearing, just where the fistula was in the case related above. He continued to work and to play, but the tumor grew, and was commencing to pain him very much.

When he entered the hospital, there was no sign of weakness about the boy. In the hepatic region was felt a body, extending transversely nine centimetres, and vertically six, and making a projection; its fluctuation was very distinct. There seemed to be two lobes, and by searching with the hand, it appeared to extend deeply into the abdomen. There was no sign of inflammation on the skin.

The anatomical seat of this affection it was rather difficult to determine; it was hard to say whether it was in the abdominal walls or in the liver, and there were some reasons on each side. For its being parietal, there was the sense of touch; it seemed as if only the skin separated it from the hand; the projection was well circumscribed, not diffused over the region; besides, the tumor was movable, easily so, and felt like a parietal tumor you were pulling here and there. For its being in the liver, percussion showed continuity of dulness, from the upper part of the organ to below the tumor; again, what was very important, when the fingers were pushed along the top of the tumor, it was felt to be continuous with the liver—it seemed to make one mass with it.

Another mode of exploration that generally solves in an absolute manner these questions, when applied in this case was faulty. Suppose a tumor to exist in the liver, when the patient takes a deep inspiration, the diaphragm going down, the liver is necessarily pushed lower; this can easily be seen at any time upon a healthy person. Here, the position of the tumor was marked upon the abdominal wall, and it was never changed at all, either by inspiration or by expiration. But from this, M. Nélaton said, it must not be concluded at once that the tumor was in the walls; but the sign in this case was faulty, because the tumor having existed for some time, it might have contracted adhesions with the abdominal walls. The continuity between the liver and the tumor was so manifest, so *frank*, that he thought it must exist in that organ. The circumscribed projection could very well coexist with a tumor in the liver; he has seen a retro-uterine hematocele diagnosed by many surgeons, a tumor developed in the walls of the abdomen.

In regard to the nature of this tumor: it was not an abscess, nor did it have the characters of cancer. It was not the age at which cancer generally shows itself, although, it is true, for encephaloid cancer there is no age. Cancer in the liver is multiple, disseminated, seeming rather to be constituted by depressions; in such cases, the projections are the healthy portions of the organs, and they do not generally come from vegetations. Moreover, the jaundice is very marked.

The diagnosis of the tumor was thus circumscribed; it was a cyst—either a pure and simple cyst or an hydatid. There are no distinctive signs between the two, except the *frémissement*, but nothing is so rare as this; it is only found in one variety, where there are very many hydatid sacs in a common sac, so that when a motion is given to the mass, they rub against each other. In this case, this sign did not exist.

In this boy, there was pain, and quite sharp pain, upon pressure. This showed that there was a work of inflammation going on around the cyst, for hydatids give no such pain; an inflammation had begun either in the sac or around it, which might cause the formation of pus. M. Nélaton was disposed to believe this to be a hydatid rather than a simple cyst; because, of the cysts formed in the liver, the hydatids are those most often followed by inflammation.

What would happen in this case? The cyst would necessarily enlarge, and from anything, from a trifling blow, it might be ruptured, and the contents thrown into the cavity of the abdomen. Beside the ruptures from external violence, they sometimes arise from processes that take place within. It was necessary, therefore, to interfere; the sac must be opened, and its contents evacuated externally. Adhesions would be excited, which would require from seven to ten days in their establishment, and then a small trocar would be introduced. If the contents were found to be serous, an injection would be made, and the opening closed at once; if pus, the hole would be kept open. Although adhesions were supposed to exist in the diagnosis of this case, M. Nélaton said that, in practice, not having their demonstration, he must conduct himself as if there were none.

M. Nélaton said that he had recently lost a patient in his private practice, whose case was very interesting. It was a woman, who had a lumpy tumor in the left region of the abdomen. There were many reasons for believing this tumor to be formed of these cysts. After a variety of treatment, she went to

Baden, and when she returned from there, she was suffering very much in the abdomen, and she had, in addition, chills and fever; all the signs of internal suppuration. It was decided to open the tumor. In twenty days, the sac was reached by means of caustics, and a trocar being plunged into it, four quarts of purulent liquid were drawn off. The canula, which had a stopcock attached, was left in the opening, and injections of iodine were made two or three times every day. The effect of this treatment was, that the sac contracted, so that no traces of it could be felt through the abdominal walls. For thirty days, everything went on perfectly well, when an abscess formed in the abdomen, and the patient died.

M. Nélaton showed the class the parts, as they were found at the autopsy. At the curve of the ribs was an opening, attached to which was a tube, one and a half inches long, of recent formation, resembling the urethra, and leading to the sac. This tube, formed where the caustic potash had been applied, was the only connection between the sac and the external walls. From it, it could be concluded that, by the aid of caustic potash, you can obtain adhesions between two layers of peritoneum, and hence form a way for abdominal collections.

Before death, M. Nélaton had thought the case to be one of abscess of the spleen; the patient had suffered much in her life from intermittent fevers. The spleen was found, at the autopsy, to be perfectly healthy. When a sound was introduced into the ureter of the left side, it went at once into the purulent cavity. The sac was a very irregular one, and it had its origin in the kidney. As the cause, the true cause, of the whole affair, M. Nélaton showed large calculi found in that organ.

It was very strange how lesions, so very considerable, could have existed so long a time without suspicion. At no period had there been any lumbar pains, either spontaneous or excited by pressure, nor had there ever been any mucous or purulent deposit in the urine. This absence of pus in the urine was thought, at first, to be owing to a stricture of the ureter; but there was none in what was examined. It was an autopsy in private practice, and but a portion of the parts could be examined. M. Nélaton thought it very probable a small calculus had descended, injured the ureter, and its walls had adhered, and obliterated the passage. Never, however, at any epoch, had the patient had hematuria, or nephritic colics, or mucus or pus in the urine.

The caustic, Vienna paste, was applied upon the boy's abdomen, at the spot already indicated. It was left there for fifteen minutes; and the next day, the scar, comprising the skin and the fatty subcutaneous cellular tissue, was removed; the excavation went down to the aponeurosis of the rectus muscle. Only charpie was applied for four days, when another application of the caustic was made. It was intended to proceed slowly, as far as the peritoneum, and then, after having left things in the same condition for eight days, to open the cyst.

When the scar, resulting from this second application of caustic, was removed, the next day, a liquid flowed away, at first serous, but, after some pressure, there was a little pus. A director being introduced, it entered perpendicularly one and a half inches, and then it could be pushed in different directions. This depth, and the ability of pushing the instrument under the ribs, made M. Nélaton say that the cyst could not possibly be in the abdominal wall. But if, as he had diagnosed, it was developed in the interior of the liver, how was it so soon opened? To explain the want of movement in the tumor from respiration, he had said that there must be adhesions already formed there. A large bit of the paste had been applied, and M. Nélaton thought it had opened the rectus muscle, the adhesions, and everything.

The contents of this cyst were easily emptied, and for a long time it was left to itself, its walls gradually coming together. When nothing but a small, short fistulous opening remained, injections of iodine were used to complete the cure.

April, 1854. A healthy looking man, about forty years of age, came into the hospital, for advice about a tumor situated in the right hypochondriac regions. Attached to it was a sign that never deceives, that cannot deceive, namely, locomotion of the tumor relatively to the abdominal walls. When, in respiration, the diaphragm contracted, and pushed down the liver, the projection formed by the tumor moved downward also. This is not an unexceptional sign of a tumor of the liver, for you can imagine a tumor of the kidney, following the under surface of the liver, and having the upward and downward movement of that organ impressed upon it, but still a tumor of the walls can never be mistaken for one of the cavity.

The nature of this tumor, situated in the liver, could be a matter of doubt. Cancer is generally multiple—here there was but one mass; when cancer is agglomerated it is lumpy—here the mass was smooth, and regularly rounded. As to its consistence, it was fluctuating; it was, therefore, a tumor containing a liquid. Liquid tumors of the liver are either abscesses or cysts; the former generally follow hepatitis, the phenomena attached to which could not be passed by unperceived. In the history of this case, there was nothing justifying the notion of there having been an inflammation of the liver, and the tumor was, therefore, a cyst.

A cyst might be either simple or hydatid, and unless one particular circumstance exists, there is no way of distinguishing them.

If *frémissement* exists, it is surely hydatid, and yet it can be hydatid, and not give this sensation. To feel this *frémissement*, you place one hand on the tumor, and then with the other you tap, *leaving the finger*. This sensation can only be produced where there is a vast cyst, containing a multitude of small ones, movable on each other. In this case there was no *frémissement*. As hydatid cysts are much more often met with than simple cysts, this was diagnosed to be hydatid.

It was thought proper to open this cyst, for reasons detailed in previous cases, and caustic was applied as usual, in order to establish adhesions. At the end of a few days, the tumor was no longer displaced by the respiratory movement, showing the adhesions to be already formed. On the tenth day the cyst was opened, the peritoneum at that time being exposed, and the brownish-red surface of the liver visible underneath. A cataract needle was taken, and when it had passed a distance of four or five millimetres, the sensation of resistance ceased, and a liquid commenced to flow. The liquid was purulent, and it contained small bodies, membranous, demi-transparent, and globular; these small bodies were the detritus of hydatids. What generally happens in these cases, had taken place here—the cyst inflames, a purulent liquid is formed, and the hydatids die. In the course of the first three days, more than one hundred of these small hydatids came away.

On account of the great danger this patient was in, of putrid infection, injections of iodine, one-third tincture to two-thirds of water, were employed with great perseverance.

Only pus and hydatids came away at first, but the third day some bile was mixed with them; on the fourth day there was more, and after that time, pure bile alone came away. Every day, one quarter of a litre, or more than half a pint, of pure bile came away, for more than two weeks. It was thought that in some parts of the suppurating cyst, there had been ulceration, and in one the hepatic duct had been opened.[1] It was thought to be the duct, because *all* the bile formed came away by it; in the stools there was no bile, absolutely none; the fecal matters had the color of mercurial ointment and lard. The patient looked very well, and digestion appeared to go on admirably. Desirous of having the bile examined, and also of knowing if there was any bile in the fecal matters, and if any substances had escaped digestion, M. Nélaton invited M. Bernard to visit the patient. M. Bernard was much interested in the case, but I left Paris before he had made any investigations, and know no more of the patient.

Hydatids, or acephalocysts, for these names are now synonymous with each other, have been looked upon as vesicular animals, without a head, or any visible organs, and formed only of a membranous vesicle, or bladder full of liquid. This bladder, or semitransparent cyst, is not, however, an animal, but a product of the economy in which it is developed.

The tissue of which the hydatid is composed, is a homogeneous substance, finely granular, and without either fibres or cells. Around this is generally a fibrous cyst, called the adventitious. The liquid contained in the hydatid is perfectly limpid; it is analogous to water containing a slight quantity of albumen.

Hydatids sometimes contain the small animals called echinococci, having the appearance, as M. Nélaton says, of fine white sand, and in that case the acephalocyst is said to be *fertile*. When none are contained, it is said to be *sterile*.

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[1] In the *Gazette Médicale*, for October 8th, 1854, is the report of a case, in which death having occurred after symptoms of intense peritonitis, an hydatid, situated in the lower part of the left lobe of the liver, was found to have opened at once into the peritoneum and into the left division of the ductus choledochus. The bile had escaped into the peritoneal cavity.

Fertile acephalocysts, in addition to the membrane already spoken of, contain also a second one, discovered by M. Robin, and called by him the *fertile membrane*. This membrane is transparent, and very thin, and lines the internal face of the other, or floats in its liquid; it is formed of very granular homogeneous substance, containing within it large drops of oil.

It is upon the internal surface of the fertile membrane, in continuity of substance with it, that the echinococci are produced. They are isolated or in fasciculi, and, adhering either by a pedicle or without one, they at last become detached, and fall into the liquid of the hydatid, where they float free.

The echinococcus is about one-fifth, or, at most, two-fifths of a line, in length, and a microscope must therefore be used in its examination. It is ovoid, with a constriction about the centre; the posterior portion is the caudal vesicle, the anterior portion is the head. The head is retractile, and armed with a double row of radiated hooks, and provided with four suckers, like that of the cysticercus; and, like that entozoon, the echinocoque presents two appearances as the head is retracted in the caudal vesicle, or projected forward. This caudal vesicle or body is composed of a transparent contractile exterior envelop, and of a very granular amorphous substance, without any traces of organs of digestion, of reproduction, or of enervation. It always contains, in the fully developed animal, some rounded corpuscles of carbonate of lime, which have a very curious appearance. The generation of the echinococci takes place by gemmation from the surface of the fertile membrane above mentioned.

"The acephalocyst belongs to all the tissues, to all the organs; it is one of the most general alterations of the economy, one of the most important on account of its frequency, of the enormous development it can acquire, of its unlimited multiplication, either in the same organ, or in a great number of organs at the same time; on account also of the difficulty of the diagnosis, of the accidents to which it can give rise, and of the indications it furnishes. Its importance is such that, in the present state of the science, the acephalocysts must be taken into great consideration in the questions of diagnosis relative to the determination of all internal or external tumors with evident or obscure fluctuation." (Cruveilhier, *Anat. Pathol.*, vol. ii. p. 92.)

Perinephritis.

January, 1852. A boy, aged seventeen years and six months, pale, thin, and feeble.

When about seven years of age, he remembered to have had a pain in the left side, for which he was forced to keep his bed; leeches and blisters were applied; he got well, and since that time his health had been always good. In the course of the past year he had been very well, with the exception of several attacks of colic, and of vomiting, but he was a turner in copper, and they are very subject to them.

For some time past he had had pain in his left flank, at first only in the evening. When at work, the patient supported himself exclusively upon the left limb, and moved the machine with the right. After some days had passed thus, he had the pain also in the morning, but after working a few hours it would go away; it always, however, returned in the evening. He could not be sure of it, but he thought that at the commencement of his affection, he had had some fever.

By placing the hand upon the left side of the abdomen, and raising that part with the other hand passed underneath the body, the existence of a tumor, hard and of an oval form, was ascertained. It extended down to very near the crest of the ilium, and toward the chest, nearly to the false ribs; it was movable, but only slightly so, and very painful to the touch. The pain he experienced was entirely limited to the tumor itself; in the thigh or the testicle he felt nothing.

It was difficult, here, to establish with exactness the diagnosis. In this region, several organs are found whose disease can produce tumors entirely similar: the spleen, the kidney, the colon, a vast serous cavity in which tumors likewise form, and the abdominal walls themselves. The spleen by intermittent fevers of long duration, or by different causes affecting its parenchyma; the kidney by the accumulation of the liquid in the distended pelvis, or again by tumors of various kinds of the parenchyma; the colon by the accumulation of feces; the peritoneum by circumscribed effusions, and the abdominal walls by phlegmon. The diagnosis of a tumor in that region is, therefore, attended with difficulty.

In the first place, there was in this case one sign predominating over all the others, excessive tenderness to the touch, and this sign tells at once the nature of a tumor; that it has been formed by inflammation, and is not a cyst, nor a mass of feces, or of tuberculous matter. This tumor could then be limited, as one having for its origin an inflammatory action. M. Nélaton said it was a phlegmonous tumor, already suppurated, having for its seat the cellular tissue, and the cellular tissue lining the peritoneum in the neighborhood of the kidney. Abscesses may be found there, that proceed from infiltrated urine, from feces, or from intestinal liquids which have escaped, or they may come from simple perinephritis. There was no pain at any point of the vertebræ, nor of the crest of the ilium; the tumor, moreover, could not have been a cold abscess, symptomatic of disease of the neighboring bones, because they are always slow in their march, and unaccompanied by pain. It might be questioned whether it were not an abscess of the iliac fossa, but in such cases the patients generally experience some symptoms of it for a long time previously. It is true that the boy had had colics, &c., but they had only lasted a very short time, and then left him, and he had never had diarrhœas followed by constipation lasting for several days, as is seen in iliac abscess. As to its being caused by an affection of the kidney, the symptoms of inflammation of the pelvis and the other parts of that organ are extremely well marked, and at no time had the urine been purulent or altered, or any other indication of nephritis been noticed; the tumor most decidedly did not have its origin in the kidney. It might possibly have been a circumscribed phlegmasia of the peritoneum, resulting in a circumscribed serous effusion, but such inflammations have their chosen seats, and all M. Nélaton has seen have been in the neighborhood of the bladder, all have been in the pelvic cavity. Moreover, at the commencement of this case, the vomitings, the small pulse, and the other alarming symptoms of peritonitis, had not existed.

The psoas muscle is quite often the seat of an inflammatory action, but M. Nélaton was prevented from fixing upon that as the cause of the tumor here, by the fact that the movements of the lower extremity were not painful.

The tumor was then a phlegmon of the cellular tissue, behind the descending colon, in the neighborhood of the kidney. In these cases, when suppuration takes place, the matter formed is evacuated externally; by the ureter, by the intestine, and sometimes into the peritoneum.

As M. Nélaton was not quite certain that an abscess had already formed, he ordered leeches to be applied to the part; these were repeated the following day, and under that treatment, accompanied by revulsion and derivation from the intestinal canal, very marked relief was obtained, so great that he was able to hope for the resolution of the inflammation. In the course of a few days, the pain had left the part, the tumor still remaining of the same volume, when he took a bath; he found the water very cold, and his pains recommenced. These pains only lasted for a day or two, but, at that time, a slight œdema could be perceived in the region of the tumor, toward the anterior part of the abdominal walls; there was also fluctuation in the tumor, indicating the existence of a liquid, of pus. There was an abscess projecting forward in the neighborhood of the false ribs, and the periosteum might be so arranged, that a serous cavity would exist between this abscess and the walls of the abdomen. M. Nélaton thought it necessary to establish adherences between these parts, which he would do by the application of caustic, and to proceed with rapidity, so as to open the abscess in eight days at furthest, because perinephritic abscesses open themselves sometimes into the abdominal cavity. These abscesses generally project posteriorly; but here, it was the contrary, and of course, in this direction the serous cavity of the peritoneum was interposed between it and the exterior.

He applied the caustic, Vienna paste, and the next day there was an eschar, which was excised, and another application made. In the course of two days, however, after having penetrated to some depth in this way, it was observed that the abscess was forming a projection toward the posterior part of the trunk, where the opening generally does take place, and where it is, of course, most favorable, for the peritoneal sac does not intervene; there was œdema, and evident fluctuation in that part. Choosing a cataract needle, because it terminated by a lance, which makes a *division* of the tissue, and not a simple *separation*, and the pedicle supporting the head cannot obliterate the hole, he introduced

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CHAPTER XIX.

AFFECTIONS OF THE ANUS, RECTUM, AND INTESTINES.

Fistula of the Anus.

It is quite unnecessary to give a separate account of every case of fistula of the anus that came into the hospital; an outline of the principles upon which the affection was treated, is quite sufficient.

When a considerable mass of tissue intervenes between the external orifice of the fistula and the anus, its cure can be obtained without the section of the sphincter; but when very near the anus, only separated by a membrane, it is necessary to do this. In the one case, the wall of the fistula is solid, is fixed, so to speak, in the perineum, while in the other it is movable. When the section is thought unnecessary, M. Nélaton makes use of iodine injections; at first, blind fistulas alone were treated in this way, but the following case, which he experimented upon, showed him that complete fistulas could also be cured.

February, 1854. A stoutly built young man, employed by a wine merchant, with every appearance of health and strength; altogether as favorable a subject as could be desired. He had been operated upon a short time before for fistula, and, very near to the cicatrix, the orifice of another was to be seen. A probe could not be passed into the rectum through this orifice, but when a liquid was injected, it was seen to pass; the fistula was complete, that is to say, there was a rectal orifice, and an external perineal one. The external orifice was situated two-thirds of an inch from the anal orifice; the internal orifice was rather high up, so that the length of the fistula was at least one inch. Every day, for three weeks, the ordinary iodine injection, composed of one-third of tincture of iodine and two-thirds of water, it into the most prominent portion of the tumor. He had scarcely penetrated a line, when he had the sensation of a vacuum, and pus made its appearance at the side of the instrument. The abscess was immediately emptied.

In these abscesses, on account of the constant, and uniform pressure to which they are subjected, there is generally a speedy adhesion of the walls, and closure of the cavity. This is what took place in the present instance, and the boy soon left, cured.

Fissure of the Anus.

January, 1852. A woman entered the wards on account of a fissure at the anus. Three months before, she had been much constipated, and, making great efforts to pass the hardened stool, she produced a tear of the parts; since then she suffered very much.

This fissure then was one accompanied with pain; for there are some that are not at all painful, that do not reveal themselves by any symptoms, as M. Nélaton was able many times to observe when at the Hôpital du Midi—a venereal hospital—where it is necessary to make an examination of these parts. And this is the manner in which the right fissures are painful; during defecation there are pains, but supportable, not very great; but little by little, in a quarter of an hour, the pain goes on increasing, to reach its maximum in two hours; the pain then is horrible, and remains so for eight or ten hours. In order to ease themselves, the sufferers generally place themselves against something hard, sometimes taking the most extraordinary positions.

In the treatment of these cases, the operation of Boyer, the section of the sphincter, is not accepted now, as it formerly was. Injections of rhatany diminish notably the suffering, and M. Nélaton said he had seen them produce cures of the fissure; the operation of cutting the sphincter, however, he said he could not advise, for it is not, by any means, free from danger. The instantaneous dilatation of the sphincter, the treatment employed by M. Recamier, is a proceeding excessively painful, but to which, now-a-days that chloroform can be given, no objection can be made. The patient being conveniently placed, the two thumbs are introduced into the anus, and the tuberosities of the ischium serving as *points-d'appui* for the fingers, they are separated until they come in contact with the internal face of the tuberosities. A resistance is felt, when suddenly there is a feeling of an interior rupture, and the two thumbs touch the bones; this is sufficient. There is no danger, in this operation, of wounding the vessels, and, in consequence of that, of purulent infection; nor is there any dressing to make.

When the patient recovers from the effects of the chloroform, he has some pains, at times quite sharp; but it is not the same pain as he felt before, it is of a different character; when this pain is over, the patient does not suffer any more. It is sufficient, during the first few days, to administer injections to facilitate the stools, and at the end of a week, the patient can attend to all his occupations.

The operation was performed as described; upon awakening, the patient had pain for about half an hour, but after that, she had no pain proper to the fissure; she said she felt something, that was all. In two days, she was able to get up and attend to her usual occupations.

June, 1852. A woman, thirty-five years of age, came into the wards for an extremely common affection; she had a fissure of the anus. Fourteen years before, she became pregnant for the first time, and, being very constipated, she felt the first symptoms of this affection.

She said that while at stool, she felt a pain in a certain point of the circumference of the anus; this pain diminished for a time, but at the end of half an hour after defecation, most violent pains commenced, that lasted two or three hours.

It is not an uncommon thing to find, at the orifice of the anus, small ulcerations, that bleed upon being touched, and when the patient makes an effort, as if to have a stool; but such ulcerations can exist without determining anything but an itching, and the discharge of some few drops of blood; they do not give rise to that fearful pain, and, above all, that pain which commences half an hour after a stool. In some cases of fissure, the whole region becomes excessively painful; here, however, it did not; the pain was confined to one spot.

In this case, the fissure was *a type;* it was a linear ulceration, not very deep, the edges extremely hard, callous, and perpendicularly cut. It was situated at a point near to the coccyx, as it very often is. In order to see the inferior extremity of the ulceration, it was sufficient to unfold a little the orifice of the anus; it occupied at once the integuments, the part occupied by the sphincter, and the interior. Varieties of the disease have been made, according as the fissure occupied these different situations; but here they were all confounded.

In the treatment of this case, no medical treatment would be of any avail. Cold injections succeed sometimes, or injections of one fluidrachm of rhatania in a little water, introduced after a large injection, thrown in for the purpose of cleaning out the rectum.

In no single case, M. Nélaton said, had he seen voluminous tents or cauterizations of any service. The operation of Boyer, the division of the sphincter, is often attended with success; Dupuytren believed that the section might be limited to the incision of the internal muscular fibres alone; but, though sometimes successful, the complete section of the muscle is much more sure. The best way of cutting the sphincter, is with the scissors; the finger is introduced into the anus, and it is pulled down and divided. At present, however, almost every mode of treatment is abandoned for that of dilatation. It is exceedingly painful, and it is probably on this account that it has not been more generally made use of.

The operation was performed as was described in a previous case; for the rest of the day, the patient complained of pain, but after that she only suffered at the moment when the feces were passing over the ulceration, and very soon left entirely cured.

January, 1853. M. Nélaton operated by dilatation upon a woman for fissure of the anus, and in ten days she was dead; the symptoms were those of peritonitis, occupying chiefly the pelvic portion of the serous membrane.

At the autopsy were found traces of an old affection; adhesions and fibrous bands, evidently of ancient formation. Besides these evident traces of former peritonitis, there was a narrowness of the pelvic cavity. At the anus, no solution of continuity could be found in the mucous membrane; it was impossible to affirm where the fissure had been. About three inches from the orifice, an alteration, a very resistant, fibrous induration of the cellular tissue, external to the muscular tissue, was met with. One accustomed to autopsies could see at once that it was very old. The patient had had a great predisposition to inflammation in the pelvis; and, in what was found, the traces of several inflammations were to be recognized. Perhaps, M. Nélaton said, by the operation he had performed, he had added the last drop of water to the vase, to make it run over.

Prolapsus of the Rectum.

May, 1852. A man, the type of stupidity, from whom but very little information as to the history of his case could be extracted. He was fifty-one years of age, and a commissionnaire. For a year back, he said the rectum always came out when he went to stool; that it was always necessary for him to reduce it after doing so, but that the reduction was always incomplete, a portion of the intestine was always exposed, and was a source of great trouble to him.

Patients with prolapsus of the rectum find that, if they go to stool in the evening, and immediately afterward go to bed, the rectum does not come out, and that the following day they can attend to their affairs. There are, however, some persons who cannot go to stool in the evening, and if they go in the morning, it is not at all the same thing. The patient may reduce the tumor, but, compressed by the circular muscular fibres, it will come out again. When, however, the patient goes to bed, puts himself in a horizontal position after its reduction, these circular fibres press the blood in its engorged veins, and push it in the other direction.

In the treatment of prolapsus, an apparatus is very annoying. A great number have been invented, but, since the introduction of anæsthetic agents into surgical practice, they have all become useless, for they are infallibly cured by cauterization. M. Nélaton said that before the introduction of these agents, he had seen Dupuytren cauterize the prolapsed portion of intestine, and that the patients expressed the most grievous pain that he had ever seen.

The cauterization was performed with the hot iron, the neighboring parts being carefully protected by wet cloths. In about two months the man left, cured.

February, 1853. A man, forty-two years of age, entered with procidentia of the inferior portion of the rectum. The affection had commenced twelve years before, and until that time he had always been perfectly well. At that time, he went to reside in the city of Rouen, where he did not live very abstemiously. At the end of some days, he found in the region of the anus a tumor, as large, he said, as his fist; he attributed it himself to excess in alcoholic drink. A surgeon made several small punctures into this tumor, from which a good deal of blood came, and in a few days he was well. The patient continued his irregular life for eighteen months, at the end of which time the rectum came out again; it would remain out until he went to sleep, during which time it would enter again.

This patient said that when he went to stool in the daytime, the rectum would stay out until he went to bed; but if he went in the evening, it would remain in all the following day. Even if he would reduce it, after a stool in the daytime, it would come out again. This is not strange, it is the rule in these cases; a reduction in the daytime is not solid—it comes out again if a night has not intervened.

When patients with prolapsus go to stool, they always have a feeling as if the rectum was not yet evacuated, and make useless and injurous efforts in order to accomplish it. They learn to know better than to trust to this feeling.

This is a painful affection; it is one that tends to increase, and even threatens life sometimes. There was at that time in the wards a young man, exhausted by the suffering and the hemorrhages attending it.

M. Nélaton said he had employed all the different modes of treatment, astringents and compressors, and had always seen them fail, except in children below the age of five or six years. With these young children, however, there are some anatomical differences in the affection, for with them all the coats of the intestine are inverted, while with the adult it is only the mucous. The best compressing apparatus he knew of, was one made use of by one of his patients, an architect, who invented it for himself; it was but a crescent-shaped piece of copper, the convexity of which was turned against the anus, and held there by suspenders; by wearing this the man got along pretty well. Dupuytren employed a method of treatment, that used to be very much in vogue, the excision of several folds of the tissues at the anus; he generally made four. M. Nélaton, who was an *interne* of Dupuytren, said that he had seen this operation performed many times, and if the surgeon were to remain satisfied with what he sees in the hospital, he would believe them cured. He said, however, that he had followed these patients after they had recommenced work, and that in the greater number the affection returned. At the present time there is but one mode of treating these cases, and that is, by cauterization. It can be done now perfectly well; though it is so very painful, that before the introduction of anæsthetic means, it had been almost entirely renounced. M. Nélaton said he could not tell how many cases he had treated by this method, and *all cured.* As a general rule, you must count upon one month or six weeks, before all the parts will be covered by skin, and the wound entirely closed. M. Nélaton never cauterizes the cutaneous portion of the tumor, but limits himself to the mucous; in this way, no narrowing of the parts can result.

Stricture of the Rectum.

March, 1852. A young woman entered the wards, on account of an affection of the rectum, which she said she had had for ten years. She was always obstinately constipated; and she complained of rectal hemorrhages.

Upon examination, the anus was found perfectly healthy, but more deeply, or about two and a half inches from the exterior orifice, a stricture was found nearly circular, and hard, and above it was a tumor, against which, when the finger was applied, it brought away some blood. This stricture was a true diaphragm, and it was not to be confounded with a degeneration of the tissues. In explaining it, M. Nélaton introduced his thumb, the index finger being in the commissure corresponding to the perineum.

A singular circumstance in the case, was the long duration of the disease; this bleeding mass in the rectum, might have been called cancerous, were it not that the long duration of the disease was opposed to such a diagnosis. In similar cases, when the ganglions are not affected, and when the discharges are not of that peculiar fetidity, be in no hurry about the diagnosis. The tumor, in this case, M. Nélaton thought, was a hypertrophy of the small glands of the intestine. It is a very serious affection, on account of the obstacle it causes to the passage of the fecal matters.

Incisions in these parts, for the removal of the altered tissues, are dangerous, for the arteries are quite voluminous, and on account of the injury of the veins. M. Nélaton said he would treat the case by dilating the orifice at the anus, as he does in cases of fissure; the fingers could then be conducted more deeply, and the stricture enlarged as the anus had been. There is undoubtedly, in these cases, a tearing of the tissues, but the operation does not have the inconveniences attending incisions. After this had been effected, he thought he would be able to modify the tumor, by the application of caustics. This patient had been, previously to her entrance, treated by incisions, but the relief afforded had not been lasting, and the hemorrhage had always been very great.

The anal orifice was dilated as is described when speaking of fissures of the anus, and the fingers were then introduced as far as the stricture, the orifice of which admitted with difficulty the extremity of the finger, and the tissues around it were very resisting. In order to dilate the stricture, an instrument was used constructed like a rectal speculum. During the operation, one causing most excessive pain, the patient was kept under the influence of chloroform. Above the stricture, there was some alteration of the walls of the rectum, and one portion was rounded so as to resemble a tumor.

Not the slightest accident followed this operation, and as to its result, it was perfect, the woman went to stool more easily than she had done for ten years before. The object of the operation was completely accomplished, but it was necessary to dread and guard against the reproduction of the affection, for there had been a rupture and not an extension of the tissues, and a cicatrix would follow.

To prevent this return of the affection, an apparatus of caoutchouc was constructed, which was easily introduced upon a mandrin, and when placed in the proper position was filled with air. By these means the parts were kept distended, and there was nothing like return of the disease, at least during the month the patient remained in the hospital.

June, 1853. A woman, twenty-four years of age, and with every appearance of fine health, entered the wards for an affection of the rectum, which, when examined, was found to be caused by a stricture. Two years before, she said that she had been operated upon for a fistula, that had followed an abscess near the anus. But it was not easy to understand how this could have caused the stricture; and when questioned in order to see if there had been great inflammation there, she said she had had no pain, nor any fever during the formation of the abscess. At any rate, according to the patient's story, the fistula had followed an abscess, and it was impossible to find whether it had been blind, or communicating with the rectum.

The finger being introduced into the rectum, at one inch from the orifice, it encountered an obstacle; in place of an infundibulum, gradually narrowing, there was, at that point, a diaphragm stretched across, having in it a hole so small that the end of the fingers could not enter. The rectum could be moved here and there; it was as movable as usual, and its walls were supple and perfectly healthy.

In order to see the extent of the stricture, the instrument made use of by M. Pajot for detaching the placenta, was employed. This can be introduced as a straight sound, and its extremity can then be made to form a right angle with the rest of the instrument. This instrument was introduced, and after it had been passed above the stricture, it was bent, as just said; at the same time by having the finger in the vagina, M. Nélaton was able to appreciate the thickness of the stricture. He found it was but a partition, having, so to speak, no thickness.

It was not judged proper to treat this stricture by dilatation, for it would be very easy to conduct upon the pulp of the finger, a probe-pointed bistoury, and make incisions of small extent to the right and left. There is nothing more easy to recognize than the arteries of the rectum; if large enough to give rise to hemorrhage, they can, generally, be felt on the finger; in this case none could be felt. This is for the immediate accidents of the operation; in regard to the consecutive, there are some, but a woman only twenty-four years of age could not be left in such a condition; if left to herself, from the very nature of the disease, very serious accidents must *necessarily* arise, ulcerations, perforations, and inflammation of the cellular tissue of the pelvis; just those accidents, in fine, that it was feared might possibly follow the operation.

These incisions are not made so easily as would be supposed, for the parts are movable, and the knife does not enter them; when, however, the opening had been so enlarged that M. Nélaton was able to introduce the end of his finger into the opening, so as to aid the blade, all the difficulty was over. After these incisions, the cavity above was found to be smaller than had been supposed—it could contain but two fingers; and more deeply a second stricture was found, shaped like a crescent, not like a diaphragm, and above that was still another. This is, in fact, the ordinary disposition of these strictures. When an obstacle exists to the passage of the urine, the increased activity of the muscles of the bladder hypertrophies them; just so is it with the rectum. It could easily be felt that there was no hardness nor granulations, but that the membrane was all smooth; the stricture was evidently caused by hypertrophy of the muscular coat. In the urethra there is, generally, an accumulation of urine behind the stricture, and a chronic inflammation results; the same thing takes place in the rectum; this patient had a muco-purulent discharge from there.

These strictures are said to develop themselves at a certain distance, at two and a half or three inches, from the anus, and in this case, one of the strictures was there situated. At that very spot, there is, in the coats of the rectum, a muscular circle quite well marked, but which must be looked for with certain precautions. By turning the intestine, it can soon be found. The deeply-seated constriction was caused by the hypertrophy of this muscular ring. It might be objected that in this case there were two; in some persons two of these circular muscles are found, and, generally, they are not perfectly formed.

After the operation, a wedge of anointed charpie was passed into the rectum, and held there, by means of a bandage placed around the body.

The case was an interesting one to follow, for it remained to be seen whether the parts could be prevented from uniting, and what would become of the hypertrophy. No pain followed the operation, and the condition of the patient was decidedly improved by it. The wedge of anointed charpie was continued, until the patient was taken with a kind of continued fever—there was a great deal of typhoid fever, that winter, in Paris—which caused the cessation of all treatment of the affection of the rectum for ten days. After her recovery, the patient being placed under the influence of chloroform—for it is horribly painful—an instrument, called the dilator of Costallat, was introduced, and the parts forced more widely apart. It is done in this way: a piece of linen, having the form of a condom, is conducted beyond the stricture by means of a sound placed like a mandrin in its interior. By means of a porte-mêche, tents of cotton are introduced, until the degree of dilatation desired is obtained. The patient complained very much after this operation, but it was repeated again two days afterward. A large bougie of wax, at least an inch in diameter, was then introduced every day, and the patient was recommended to continue its use for a long time. The patient had, by this time, remained nearly two months in the wards, and could not be persuaded to remain any longer. When she left, her condition was infinitely better than when she entered; but whether she became permanently cured, is not known.

Cancroid Affections of the Rectum.

The following case was called, by M. Nélaton, polypus of the rectum; but, on account of the pathological anatomy of the affection, is here placed among the cancroids, or epithelial tumors of that organ:—

December, 1851. A man, fifty-two years of age, and stoutly built. At the age of eighteen, he had the scurvy, of which he was cured, and after that he had a pneumonia; but neither of these affections had anything to do with the disease for which he then entered the hospital. In 1829, when, consequently, he was twenty-two years of age, he commenced to pass some blood with his feces, and he said he always remarked that every month, at a certain period, the discharge was increased; the man declared that at that time he passed a litre (or about one quart) of blood, but patients always exaggerate in these cases. In 1840, he commenced to pass some pus with the blood, to explain which, the man said the piles had ulcerated; and he suffered, moreover, a great deal of pain. A year afterward, he went to a surgeon, who excised and cauterized the hemorrhoids, and he was cured. In 1848, an abscess formed itself near the anus; and, one year afterward, he entered Velpeau's wards, in order to be treated for a fistula ani. He was operated upon, and left the hospital, cured of the fistula, but having lancinating pains in that region. Some time after, while at stool, a tumor came out; he reduced it, and it remained until a month before, when it came out again.

When this patient came into M. Nélaton's hands, the anus was occupied by a tumor the size of a small chicken-egg, mammillated, lobulated, and supported by a kind of pedicle, which went into the rectum. This pedicle, explored by the finger, seemed to be doubled upon itself, the fold looking toward the left side, and forming in the pedicle a gutter as large as the fingers.

This tumor was diagnosed to be a true polypus of the rectum—a very rare affection in adults; so very rare is it, that M. Nélaton knew of but two cases—one of Désault, the other of Jobert; he had searched, and that was all he could find. In children, it is not so rare; the symptoms, with them, are loss of blood; and, on this single indication, until the age of eight years, the existence of a polypus can be affirmed; and the surgeon will scarcely ever be deceived; of course, with the loss of blood is the coexistence of a small tumor. Sometimes these polypi can be separated with the fingers, as a grape from its stem; in fact, in the great majority of cases, this can be done. As to their structure; their surface is smooth, being developed with a layer of mucous tissue, and containing small orifices conducting to small loculi, as in the tonsils.

This tumor was not a prolapsus; there was not that orifice in the centre of the mass, nor were there any hemorrhoids. It resembled very much invagination, but there you cannot find a point of implantation—it is all around the intestinal wall.

In this tumor, no vessels were to be found. In the pedicle, was a point where the hardness of the tumor ceased; and, after that, it was soft, as in mucous membranes: so that that portion was believed to be the intestinal wall dragged down. The soft portion occupied, perhaps, two-thirds of the pedicle, which was about an inch and a half long.

A string was tied around the tumor, and the parts were pulled out, so that they could be well seen. M. Nélaton had said that he would cut the pedicle slowly, but if he found any large vessels, he would lay the knife aside, and apply the ligature;

he, however, applied the ligature immediately without any previous sections, having fear of hemorrhage.

Upon examination, after its removal, it was decided to be a follicular polypus, analogous to those of the uterus; the follicles of that organ give rise to polypi; and why should it not be true for those of the rectum? The microscope showed it to be formed of hypertrophied follicles. No accident followed the operation, and in the course of a short time, the man went out as cured.

In December, 1852, just one year after having been discharged as cured, this patient re-entered the wards, complaining, as he had done before, that is to say, of a tumor in the rectum, bleeding with the greatest facility. The finger found a tumor mamellonated, and nearly globular, about eight centimetres in diameter, and bleeding most readily; seeking to determine its exact relations with the rectum, M. Nélaton thought it to be implanted rather to the right, and a little above the prostate. In order to explore the parts well, however, he said it would be necessary to dilate the anus.

This tumor M. Nélaton proposed to remove. Six years before, a mamellonated, bleeding tumor of the rectum, such as this one was, he would not have hesitated to declare cancerous; but at the present time, he believes that there are some tumors resembling cancers in many respects, that cannot be ranked with them; they have not the same march, they rest a long time stationary, they give rise to none but local symptoms, no affection of the ganglions, and no cachexia; the appearance of the patient under consideration was that of excellent health. Cases similar to his, M. Nélaton had seen a number of times, and at first had prognosticated a speedy death, but saw the contrary. Seeking to find some distinction between these tumors, it appears to him that tumors that turn out not to be cancerous are much softer than cancers, and bleed more, for cancers of the rectum do not predispose to hemorrhages. In regard to their nature, comparing them with what is seen quite often in children, a tumor that comes out while at stool, is a polypus. The microscopists said, after having examined the tumor one year before, that they found all the characters of the glandular structures, and none but the normal elements of the economy. M. Nélaton said he had no great confidence in the micrographs in regard to their ability of distinguishing between pathological tissues, but he had in their power of distinguishing the normal.

The death of the tumor was produced by causing mortification in the pedicle, by a pair of forceps, and it was thus extracted. The man went out, and whether he continued cured this time or not, I cannot say.

April, 1852. A man, about forty years of age, entered the wards. He said that for a long time he had suffered from hemorrhoids, but that within a few months some change had taken place in his affection. Upon examination of the anus, the posterior and lateral portions were found to be diseased, while the anterior were healthy; the induration extended seven or eight centimetres, or about three inches, up the intestine; two centimetres laterally, and two or three posteriorly.

The man said he had taken antisyphilitic remedies, but with no good effect. It was decided to cut away the diseased tissues, making a partial extirpation of the rectum. The operation was very long; many vessels were opened, and it was necessary to tie them, for the rectum, freed from its adhesions, goes up into the cavity of the pelvis. The section of the walls was made into tissues soft and healthy, except in one single point, on the right side, where a prolongation of the induration ascended quite far; traction, by means of two tenaculums, was exercised upon this, and, after some time, it came down so far that soft tissue was found above it, and then the incision was completed. As dressing, a tent was introduced into the rectum, to be changed every day. For the first two days, the patient did very well; on the third, the sides of the wound looked black, but it was thought to be owing to color imparted by fecal matter; a most thorough washing of the parts, and an alkaline bath were ordered. On the fourth day, the patient was attacked with symptoms indicating an inflammation of the cellular tissue of the pelvis, of which he died two days afterward. At the autopsy, the cellular tissue at the side of the rectum was found infiltrated with pus.

This operation of resection of the rectum is a very serious one; two-thirds of those operated upon die.

January, 1853. A man came into the hospital, who had been there before in a most horrible condition, from necrosis of the lower maxillary bone. Of that he had entirely recovered; the restoration of parts had been excellent. He entered again on account of an affection of the rectum, about which it was difficult to get good information.

For eighteen months, he had suffered from constipation, and losses of blood; at first the feces came away in small pieces, like the dung of sheep, and after that had continued some time, blood came away, and after that bloody matter. He had a feeling at the anus which, he said, was like what one would experience by putting pepper on a blistered surface.

Externally, at the circumference of the orifice of the anus, were two projections, resembling those caused by hemorrhoids; they were hard, and, internally, they were ulcerated. The finger being introduced, the rectum was felt to be very irregular; its walls were mammillated and hard, the hardness varying, in some places being cartilaginous; some of the tissue was brought away by the nails. By pushing the finger still further in, a portion of the rectum still more narrowed was met with, and after that was passed, it went into a large cavity, whose walls were soft and supple; the extent of the degenerated portion seemed to be about three inches. As to the mobility of the intestine, the indication of the healthiness of the neighboring tissues, it was difficult to answer, but M. Nélaton said he had found enough diseased tissue to contra-indicate the performance of partial excision of the intestine, a very serious operation. No doubt the disease was cancerous, and the patient most surely would die, if surgery did not intervene; still, an operation in such a case was improper. Death could happen here, either from the obstacle afforded by the disease to the passage of the feces, for which, in some cases, an artificial anus has been made in the lumbar and iliac regions; or by intestinal perforation, which is not rare, and might be said to be the most common termination. This perforation can take place in two ways, altogether different: in one, it is into the peritoneal cavity, there where the peritoneum forms a fold between the bladder and the rectum, and the patient dies from peritoneal inflammation; in the other, it is below that, and the patient dies from inflammation of the cellular tissue of the pelvis.

An operation was not thought proper in this case. In the first place, there was no obstacle to the passage of feces; as in the stomach, a cancer of the pylorus at last renders the passage into the duodenum more open, from the destruction it causes, so, in this case, there was no longer any difficulty from the narrowness of the tube. Again, as to the danger from perforation, it was rendered much less by this free course of the stools. The patient was very weak, and the operation is a very serious one; his death might follow it very closely. It was thought best, then, to limit the treatment to palliating the condition of the patient, and to combating the different symptoms which would show themselves in the course of the disease. The patient did not remain more than a few days in the wards, as he was very desirous himself of being operated upon. This case is the one M. Nélaton refers to in the ensuing cases, as having been operated upon by M. Maisonneuve, and, although the peritoneum was largely opened, the man recovered.

July, 1853. A young man, twenty-eight years of age, who had been in the artillery; it appeared, however, from his answers, that he very rarely had performed active duty; he was almost always occupied as a groom, so that it must not be supposed that he was a horseman.

His story was, that, eight months before, he had a frequent desire to pass his water and his feces; at first there was no suffering, but afterward, there was a feeling of heat, and the feces had bloody spots upon them; when he entered, his sufferings while at stool were excessive.

This was what he said, but being inclined to believe that the disease had already lasted more than eight months, M. Nélaton inquired further, and the man said that, when fourteen years old, he had taken a long walk, after which he felt pain at the anus, and, for about six days, he passed blood from there; ever since that time, he had had more frequent desire to go to stool than is natural, and the loss of blood, and the feeling of heat, had always persisted. Upon examining the patient, at the anus, there was found nothing abnormal, no piles, no fissure; and the parts around were natural. The finger being introduced into the rectum, at some distance it was arrested by lumps, hard, and very irregular; the largest, as large as the end of the thumb; here and there were felt fissures and holes. The passage of the finger through these coriaceous tissues produced very severe pain; and as it was very important to make a thorough examination, chloroform was administered. In making this exploration, M. Nélaton advises the same plan as in touching a woman: the patient should be on his back, and the pulp of the finger turned forward, toward the prostate. In this case, it was impossible to push the finger beyond the limit of the affection. Thinking to find the tumor in the iliac fossa, it was examined, and a hard body was detected there, evidently the upper part of the degenerated rectum. As regards the thickness of the degenerated parts, the whole was fixed with remarkable firmness in the pelvis, whence it was concluded that the cellular tissue was affected. As respects the functions of the rectum, defecation was impossible, except when the feces were liquid, or in very small balls; and, moreover, the patient could not retain his excrement; his rectum was, so to speak, inert.

The patient said that, in order to procure a stool, he had recently eaten cherries, swallowing them, stones and all; these foreign bodies had stopped above the diseased portion of intestine, and there formed a kind of valve. M. Nélaton said he would not be astonished to see very serious accidents result from them, and he would extract them with forceps.

As to the nature of the affection, M. Nélaton said it was quite difficult to speak; it was true that it was cancer of the rectum, according to what is described as such; but he did not think it truly cancer; it was one of those affections simulating cancer, but not cancer, that do not attack other organs, that do not produce cancerous cachexia. This young man had a good complexion, and was strong and healthy. It was a peculiar form of affection of the rectum, differing from cancer in its local phenomena, and, above all, in its effect on the economy; it is what is called epithelial tumor, epithelial cancer, cancroid. No doubt, had this patient been examined five or six years before, tumors would have already been found there.

As to the prognosis in these cases, M. Nélaton has already spoken on a previous occasion.

In the treatment of this patient, in spite of his good health and youth, and the non-malignancy of the affection, he did not think that the extirpation of the diseased tissues was to be thought of. Lisfranc, the boldest of men, gave it as a rule, never to operate when the finger cannot reach the limit of the affection. The position of the peritoneum varies, it is true, but it is generally only about ten centimetres, or four inches, from the anterior border of the anus; there are some exceptions. M. Vidal, out of six bodies examined for the purpose, found it to vary from two to four inches; and Blandin has noticed that, in children above all, it descended much further. Whenever, therefore, you extirpate the rectum, you perform a dangerous operation. The patient who was lately in the wards (in June), upon whom M. Nélaton had been unwilling to operate, had been operated on fourteen days before, and was then doing well, although the peritoneum had been very largely opened. The operator, however, would not have performed the operation, had he known that this would have happened.

In this case, M. Nélaton would do all he could to enlarge the opening; the disease was not essentially malignant, and was fatal only by acting as an obstacle. A great number of instruments have been made to do this, but he prefers that of M. Costallat; it is easily supported by the patient, and easy to introduce into the crooked windings of the intestine.

This patient also left the wards, but I do not know whether he succeeded in finding any one to operate upon him, even M. Maisonneuve.

January, 1854. A man, sixty years of age. Ten or twelve months before his entrance, he had felt the first symptoms of his disease. It had commenced with pain and great difficulty in passing his stool; this difficulty passed away, but the pain continued; after a time, a great deal of mucus came away, and this, at last, had become mixed with a sanious discharge.

Upon examination, all the posterior part of the rectum was found to be entirely healthy, and also the lateral parts, until you came to the anterior, where an ulcerated projection was felt, shaped like a curved finger. This diseased portion descended to within four lines of the anus, and the end of the finger touched its superior limit when the perineum was depressed. It was oval in shape, its long diameter parallel to the axis of the intestine and six or eight centimetres, or about three inches, long. The patient suffered chiefly in defecation, and passed a bloody mucus

This patient remained a long time in the wards, for it was judged proper to limit the treatment to palliatives. It was very probable that, in attempting to extirpate the diseased tissues, the peritoneum would be opened, and the bladder also; it is true that such diseases have been extirpated with success, and in one case in which the peritoneum was opened the man recovered, yet it was not judged proper to risk it here.

Here, the disease would progress; of that there could be no doubt, but it might permit of life for a long time; above all, as it did not prevent the passage of the feces. These affections of the rectum justify the divisions of cancers and cancroids, for in them, if the cachexia comes at all, it comes at the end of a long, long time.

Hemorrhoids.

January, 1852. A young man entered the hospital, who in his infancy had commenced to experience the first symptoms of hemorrhoids. The rectum, after a stool, had a great tendency to become displaced, so that he was obliged to go in the evening, to obtain a horizontal position in bed, immediately afterward. This patient's sufferings were very great; he had passed three days without sleep, so that it was necessary to do something for his relief.

The best treatment is cauterization, the objection to which is, the excessive pain it causes, but the patient can now be rendered insensible to this by chloroform. Either caustic or the actual cautery may be chosen for this purpose; the latter having the advantage of being much more expeditious. An iron wire is made to traverse the piles, and thus fixed they can be held outside during the application of the iron, in spite of all the efforts of the patient.

M. Nélaton destroyed all the hemorrhoids at one sitting, by the actual cautery, and the young man soon left cured.

January, 1854. A man, that M. Nélaton had known for some time, came into his wards, to be freed from hemorrhoids. The man was very much changed by the loss of blood, and by the suffering he underwent from their strangulation.

The hemorrhoids had been cauterized three years before by M. Nélaton, at St. Louis, but the cure had been but temporary, and it was necessary to cauterize them again.

This cauterization of hemorrhoids must be made with some precautions. In the first place, it is so painful that chloroform must be administered; *this is indispensable.* In the second place, as these tumors, when the cautery is applied, fly away and enter the anus, a thread, and a metallic one, for another would be burned, must be passed through them. And, lastly, in these cases, the surgeon does not cauterize as deeply as he thinks, and at the end of some time, when the scars fall, he regrets not having done more. *Deep cauterizations are not more dangerous than others.*

Theory might make the surgeon dread this destruction of tissue, as liable to be followed by the narrowing of the rectum, but although he has done it again and again, oftener than he can count, M. Nélaton has never seen anything of the kind, even after the deepest and most complete cauterizations.

The patient being placed upon the table, a metallic wire was first passed through the tumor, and then a thick fold of linen dipped in water, having a hole in it corresponding to the mass, was applied, for the protection of the neighboring parts. It should be said that, in this case, the hemorrhoids were attended with prolapsus of the lower part of the rectum. The patient being then placed under the influence of chloroform, the mass was thoroughly burned with the red-hot iron.

At the expiration of half an hour, sensibility returned, and the patient suffered very much for the rest of the day; the next day he was very easy; he had no fever, and was asking for something to eat. It is thus that things generally take place after this operation. The scars separated and cicatrization went on rapidly, so that by the tenth day of the operation, the man felt no pain, except when at stool. His lips began to color, and his whole appearance had changed very much for the better, when he left soon afterward, cured of his hemorrhoids.

Hernia.

January, 1852. A young man, who, while at work some days before, had been seized with colics. His comrade gave him some absinth, but the pain becoming constantly greater, he went home and called a physician. The physician found a hernia with signs of strangulation, and after its reduction the patient ceased to feel the colics. A bandage had been applied at once, but it caused him much pain, for the hernia had not been entirely reduced.

When he entered the wards, there was a tumor in the right side of the scrotum. In the lower part it was easy to distinguish the testicle; above that there was another part, transparent and fluctuating in the inferior portion, but not so at the inguinal ring, where it was compact and hard, and terminated by a pedicle entering the ring. There was here a hernia of the epiploon, with serosity in the herniary sac. It was tried, by pressure, to make it enter the abdominal cavity, but without success.

Cases like this are very common. M. Nélaton recollected a case in which Marjolin and Bérard mistook the herniary sac filled with serosity, for a cyst, and treating it by puncture and the injection of iodine, the patient was dead in forty-eight hours.

In the present case, there was also an epiploic hernia, and this formed an impassable stopper between the contents of the sac and the peritoneal cavity. M. Nélaton said he would empty this sac by a simple puncture, and when the sac had been emptied, he could act better on the contents.

In reading the observations of Pott, of Arnot, and of Malgaigne, who say that these irreducible hernias can be reduced solely by position and by compression long continued, it is seen that *all* are enormous hernias, and M. Nélaton believes them to be cases where they were irreducible from their volume, and not from their adherences.

After the emptying of the sac, the epiploon was made to enter the abdominal cavity, and, a proper bandage having been applied, the young man left the wards.

June, 1852. A man, about fifty years of age, entered the wards with symptoms of strangulated hernia, which were relieved by the reduction of a tumor situated in the right groin. In the left groin was another tumor, the size of a small pigeon-egg, giving the sensation of fluctuation; it was placed beneath the crural arch, precisely where crural hernias generally present themselves; this tumor was irreducible. This was a herniary tumor, but not at that time a hernia properly speaking; it had been one, but at that time only the sac was left, filled with liquid. This is not a rare thing to meet with.

When the neck of a herniary sac closes, an accumulation of liquid may take place in the sac, and sometimes an accumulation of fat around it; the tendency of the cellular tissue of the peritoneum to the formation of fat is well known. In making dissections, when, in the crural region, a fatty tumor, as large as a hazel-nut, is met with, examine it attentively, and it will often be found to be thus formed. Sometimes a probe can be passed into a capillary orifice, leading from the cavity of the sac into the peritoneal cavity, and sometimes the orifice is closed, and the tumor isolated. Ambrose Paré speaks of a case he met with, and which he thought was a hernia of the epiploon.

The best thing to be done in these cases is to let the tumor alone, and the man was therefore discharged.

June, 1852. A patient entered the wards laboring under an *internal strangulation*, M. Nelaton making use of this term without wishing to prejudge anything as to the cause of the arrest of the fecal matters. For seven days he had been vomiting brownish, yellowish matters, and at the same time there was complete interruption of the stools. The prostration was extreme, but in spite of it the pulse was still good. All over the abdomen the sonorousness was exaggerated, and there were rounded projections, so that it seemed as if the folds of the intestine could be seen through the abdominal walls.

M. Nélaton spoke at some length of different objects that can obstruct the intestinal canal, of strictures from degeneration, of cicatrices after ulcerations, which are not at all rare in consumptive patients, of adhesions, and of foldings of the intestine upon itself. Quite frequently the vermiform appendix is found to be the cause of internal strangulation.

The manner in which diverticula of the intestines, digitiform appendices, cause internal strangulation, is rather difficult to understand; it takes place in the following manner. The intestine forms a fold very near and touching the appendix; this becomes wrapped around it, and its extremity, in finishing the circle, passes between its point of origin and the intestine. Now suppose this extremity becomes swollen, it cannot go back, and the appendix has formed a firm knot around the fold of intestine. That such an internal strangulation is not a mere creation of the mind, M. Nélaton showed by a wet preparation he had obtained at an autopsy. In it, the state of affairs was precisely as they have just been described. Sometimes the knot is even double, of which he showed an example in another preparation. This strangulation by an appendix happens generally upon a portion of the ilium, about three feet from the cæcum, in the right iliac region.

In this case there was nothing to be judged from the antecedents. Death, and in a short time, was to be feared, but it was necessary to try to save the patient. In the note the man brought with him into the hospital, no mention was made by the physician who had attended him, of his having employed any purgatives, the most useful means of treatment in these cases. A drop of croton oil, dissolved in some bouillon, was administered, and a long catheter, the one used for the œsophagus, was introduced into the anus and left there for a long time, in order to solicit the contractions of the intestines. Over the abdomen refrigerant applications, by means of bladders filled with ice, were employed, in order to diminish the quantity of gas in the intestines. A short time after the employment of these remedies, in the afternoon, the man passed a large quantity of stercoral matter by stool, and again in the night. The following day the abdomen was extremely sunken. The third day of his entrance he was in a condition of profound prostration; his pulse was feeble and beating one hundred and twenty pulsations in the minute, and he was in a state of extreme torpor.

If in these cases of internal strangulation, the patient must inevitably die, should the surgeon try an operation? In one case M. Nélaton had opened the abdomen and made an artificial anus; the patient died, but not until fifteen days afterward. M. Maisonneuve performed a similar operation, and his patient recovered. By the operation you have some chance, though a very slight one, of curing your patient. It is true that it is said that, sometimes, all of a sudden, the passage of the feces has recommenced, but, nevertheless, the surgeon should operate, and make an artificial anus.

Four days after his entrance, the patient died. At the autopsy, the ilium, for the space of an inch and a half from its entrance into the cæcum, was only a narrow cord. At that spot were bridles, which fastened the intestine very low down in the pelvis, and compressed it; above them the intestine was dilated.

December, 1852. A man came into the wards, on account of a tumor, that was situated in the anterior wall of the abdomen, about half way between the umbilicus and the xiphoid cartilage, in the linea alba. This tumor was rounded about an inch and a half in diameter, and movable. There was no alteration in the integuments. Although movable, it was easy to perceive that this tumor was attached by a pedicle to the deeply seated parts. While handling the tumor, the *interne* was sensible of the reduction of a portion of it, with a gurgling sound. The patient pretended that this tumor had shown itself, for the first time, only three months before, and that it had been slowly increasing ever since that time; he said he found it there one day after having passed a night in working. The patient was subject to vomitings, and, when his stomach was empty, he threw off glairy matters.

M. Nélaton said that the fact of tumors being formed in this situation by the hernia of a portion of the stomach, was one well determined, and that he was very much inclined to believe this to be one of them. There was a possibility of its being the transverse colon, but that predisposes to colics rather than to vomiting.

The sensation experienced by the *interne*, showed that the intestine was reduced; what was the mass remaining outside? This was supposed to be the herniary sac having around it a deposit of fat. Sometimes, when an intestine has been reduced, the sac remains, and on its exterior a fatty layer forms itself, which, little by little, diminishes the dimensions of the sac. There results, at last, a fatty tumor having a pedicle, and in the centre, if it be cut in two, a small serous sac will be found. It is well to know of this disposition, for these old sacs can inflame, and if a communication exists with the peritoneum, serious accidents can result.

The indications, in this case, were to prevent the protrusion of the portion of the alimentary canal, and a bandage having been applied for this purpose, the man left the hospital.

January, 1853. An exceedingly corpulent woman was sent to the wards in an advanced stage of her disease. At the umbilicus there was a tumor, about three inches in diameter; the skin was red and thinned, so that a purulent collection could be seen beneath it. In seeking to isolate this tumor, it seemed to be confounded with the cicatrix of the umbilicus. It was thought proper to make an incision into this, and it was found to be a fatty mass, a tumor of the epiploon that had suppurated.

After the incision the patient was much relieved, and her cure was confidently expected, when she was suddenly seized with symptoms of cerebral congestion, and died in the space of eighteen hours.

December, 1853. A case of strangulated hernia entered M. Nélaton's wards, a very rare thing, indeed, for they are in a hospital, situated in a quarter of Paris where but few *ouvriers* reside. The patient, a woman, had had a hernia for ten years in her left groin; she had worn a bandage for a long time, but the hernia was not retained by it; it always escaped. During the whole of these ten years, there never had been any accident.

On Sunday evening, about ten o'clock, without any appreciable cause, she commenced to vomit. She, herself, thought it was an attack of indigestion, but thinking also that it would be well to examine the tumor, she found it larger and more tender. A physician was called, who tried the taxis. The effect of this first attempt was of great interest in the case, but all the patient could say, was that the physician thought he reduced some portion of the tumor. On Monday, the vomiting still continued, and a new symptom appeared, the absence of stool; another attempt was made by the taxis, with always the same result. On Tuesday, the physician sent her to the hospital. At that time, there was no more vomiting, and the general condition of the patient was very good; there was no stool, however. The *interne* made no attempt to reduce the tumor existing in the groin, and only ordered a purgative injection; when it was thrown off, it brought with it some feces. On Wednesday, when M. Nélaton saw her for the first time, she had no vomiting, and her pulse was very good, so that he found himself in some incertitude as to what he ought to do. Considering it a hernia in a state of strangulation, he ordered a dose of castor oil; at the end of some time she vomited, and a disquieting change commenced soon after. The tumor was situated in the inguinal part of the groin; it had the size and form of a pigeon's egg, the great diameter in the direction of the inguinal canal, and was so hard to the touch that M. Nélaton said his first impression was that it was a lymphatic ganglion. There is one circumstance, which, in case there should be any doubt as to the nature of a tumor in this situation, settles the question at once. While in hernia there is an exterior tumor, there is also always attached to it *a pedicle*, and nothing is easier, under ordinary circumstances, than to recognize this pedicle; put the abdominal walls in a state of relaxation, and it will be felt at once. At times, owing to pain and tympanitic distension of the abdomen, it is difficult to trace this pedicle into the abdomen; but, when this is the case, by circumscribing the tumor, it will always be found that a certain portion goes into the abdominal walls. When this pedicle was felt, M. Nélaton was sure that the tumor was formed by a hernia of the contents of the abdominal cavity, and not by a lymphatic gland or cyst, situated in the walls.

This question as to the nature of the tumor, being settled, there still remained the important one—Was it the cause of the symptoms? After the administration of an injection, some feces had been passed—did this show that the passage had become re-established? This, M. Nélaton said, it did not do, for when the difficulty takes place in the small intestines, the parts below can empty themselves several days afterward. He had seen the same thing in the early part of that week, in his private practice, in consultation with M. Laugier; in that case, the hernia was umbilical. It is a fact, then, well established, that in cases of hernia, one or two stools, not very copious it is true, do not indicate the re-establishment of the passage. Pain in the tumor—what is this sign worth? In the present instance, the tumor was not painful, or but slightly so; it is a sign well worth knowing, and of having fixed opinions upon. M. Nélaton said a physician had lately sent for him to see a case, in which even the taxis was not painful; it was necessary to press very hard to cause pain. This patient had vomitings, but they were aqueous, resembling very much those of cholera. The physician said the patient had been worse in the morning, and under excitants had become much better; it was his opinion that the case was one of cholera, and that the hernia had nothing to do with the symptoms; he therefore asked M. Nélaton to wait until the next day, to which, seeing no harm likely to result, he consented. The next day he was not sent for, but the following one, they came in haste for him to operate. The operation was performed, the intestine reduced, and the patient got well. This case was related to show that a hernia can be strangulated, and yet not be painful; and, as said before, the patient can also have some stools.

During Wednesday, the vomitings recommenced, and they became stercoraceous; it must be understood that they were not truly stercoraceous, for they never are, but they were what is called so, in these cases. Slight efforts at taxis were made, but seeing it was vain, M. Nélaton operated.

Quite a large incision was made, for half an inch, more or less, does not increase the danger, and does increase very much the facility of the operation. After dividing the skin, the layer of subcutaneous cellular tissue, and the superficial fascia, he came to a fatty mass, simulating the epiploon; as, however, M. Nélaton was sure that it was not an epiploic hernia—he was certain of not having opened the sac—he therefore cut carefully but resolutely through this fatty tissue, and at last came to the sac.

In operations for hernia, it is of the greatest importance to understand the condition of the sac. If it contains sanguinolent serosity, it will look blue and like the intestine; and when opened there will be a jet of liquid. When there is no liquid in the sac, if the hernia be of the intestine, through the transparent tissue a *black ground* will be seen; when it is of the epiploon, there will be no black ground; but there is no danger in cutting it. It is thus seen that in any case, the sac can be opened with safety when the surgeon knows what he is about. In the crural region, epiploic hernias are the most common.

When a hernia has been reduced, the sac remaining outside and no longer gradually distended by intestine, a fatty layer grows upon it; by degrees, the sac becomes smaller, and at last there is but a very small serous cavity left. There is then a mass of fat, globular, and supported by a pedicle, which enters into the cavity of the abdomen; at last, the neck of the sac can be entirely obliterated, but by cutting open the fatty mass, the mode of its formation will be seen. Such a globular mass of fat can very readily be taken for an epiploic hernia. This is what had taken place in the present case, but M. Nélaton, being aware of the circumstance, cut through the fat until he came upon the sac. Sometimes the surgeon reduces the whole mass, *and as most generally the strangulation is in the neck of the sac*, the intestine is left as it was before the operation.

M. Nélaton relieved the stricture, after the method made use of by Sanson. The object for which the operation is performed, is the relief of the stricture strangulating the intestines, and in the immense majority of cases, this is not in the canal, in the fibrous ring, formed by the abdominal walls, but in the neck of the sac. He therefore opened the sac, his assistants seized the two edges and pulled it out, and he then extended the incision as far as he wished. The narrowest part of the canal was then cut with the scissors, and the mass was easily reduced. By operating in this way the whole question of making one or many incisions falls to the ground.

Some moments after the operation, the patient vomited, but as chloroform had been administered, the sickness of stomach was probably owing to it. Scarcely a second had elapsed after the reduction of the hernia, when the patient had a huge evacuation, a complete evacuation of the intestinal canal. During the rest of the day she had no pain in the abdomen—she had none, it should be said, before the operation—the next day, Friday, the patient was doing very well. M. Nélaton called the attention of the class to a very important part of the operation for strangulated hernia, namely, the dressing of the wound. In old times, surgeons introduced charpie, in the form of a tent, into the wound before applying any dressing; now-a-days, passing from one extreme to another, they employ sutures, in order to heal the wound as soon as possible. Sometimes the effect of this plan is enchanting, and in a few days there is no trace of the operation. In one case, M. Nélaton was induced to try it; the second day everything looked very well, but the third there was a slight elevation of the parts; the fourth there was tumefaction, tension, and intense fever; in short, all the signs of diffused phlegmon, comparable to those resulting from vast urinary infiltration. Upon opening the engorged parts, they were found to be separated from each other as far even as the lumbar region, and the patient at last sank from the effects of the suppuration. All this M. Nélaton attributed to the imprisonment of putrid matters, shut up by this union of the edges of the wound by first intention. He has seen the same thing to occur in the wards of M. Malgaigne, and also in another case in private practice, so that now he entirely renounces the immediate and complete reunion of the divided parts after this operation; it is true that it is the prettiest operation, but he begged the class always to prefer the other. These bad effects result from this, that the sac exhales a bloody serum, which, having no means of escape, is forced to remain, and infiltrates the cellular tissue.

On Friday the patient was doing as well as possible; on Saturday, there was a change in her physiognomy, and her voice was much altered; it was evidently that alteration of the voice found in patients with cholera, which disease, at that time, was prevailing in the Parisian hospitals. The patient said she had had many liquid stools in the night, but no vomitings. As far as the hernia was concerned, there was no sign of anything unfavorable going on. Astringents and opiates were administered, chiefly by injections, but the disease was not at all arrested. On Sunday, the evacuations still continued, the eyes were deeply sunken, the woman was cyanosed, and it was only now and then that a pulse could be felt at the wrist. Ether potions, wine, and other stimulants were given, and on Monday she looked better, but had no pulse in the brachial artery, at the elbow. Warm external applications, and the internal stimulants were continued, for cases of cholera as bad as this have recovered; they have done so under all kinds of treatment, and when abandoned to themselves; but this is the treatment M. Nélaton prefers. As regards the wound, there was a decomposition of its edges; a decomposition, so to speak, chemical. On the cornea of the left eye was a black spot, and it seemed exactly like what is seen in dead bodies. All this indicated profound prostration. The same day the patient died.

At the autopsy, no signs of peritonitis were discovered. The traces of a circular constriction were found upon the intestine, externally; the serous coat had there a violet color. Sometimes, when this is all that can be perceived in the serous tissue, the mucous tissue inside is found to have sloughed: but here, when the intestine was opened, it had its natural appearance, with the exception of some slight ecchymosis. As regards the lesion said to be peculiar to cholera, and to be found, above all, in the abdomen, it could not be detected; there was only a slight redness of the mucous membrane. M. Nélaton had been of opinion that the hernia was either a direct inguinal hernia or a crural; it was found to have been the latter; the upper orifice of the infundibulum was large enough to admit the finger. As a general rule, the hernia goes into the infundibulum, and comes out of one of the holes in the cribriform fascia, and there the strangulation takes place. In this case, however, according to M. Nélaton, *the stricture had been at the large hole at the base of the infundibulum.*

February, 1854. A woman with a strangulated crural hernia, was sent from the country, into M. Nélaton's wards. The symptoms were so pressing, that he performed the operation almost immediately after her arrival. The manner in which he performs the operation, and the subsequent dressing he applies, have been already sufficiently spoken of. In the sac were found epiploon and a small portion of intestine, that appeared to be in a good condition, but every one, when the sac was opened, remarked an odor as of some decomposition. There were several stools almost immediately after the reduction of the intestine. Signs of peritonitis showed themselves, for which leeches were applied over the abdomen; the woman, at that time, had her menses, and as the discharge was not interrupted by the operation, she also lost blood in that way. Before long the patient had vomitings, painful, and greenish, as when there is peritonitis; the belly became tympanitic, and the pulse small and frequent, what the French call *miserable.* In thirty-six hours after this, the patient died. Death is often seen as the result of the operation for strangulated hernia, and the reason is, in M. Nélaton's opinion, that it is too long delayed. The operation is more often attended with a happy result in private practice, than in cases brought into the hospital, for this reason.

In this case, in performing the operation, those layers of fat, situated on the exterior surface of the sac, so often spoken of, were also found. As regards the signs enabling the surgeon to distinguish an intestine from the fat, one, derived from the color, is quite sufficient. The strangulated intestine is always red, almost black; there is no exception to this deep color, red, bordering on the violet, almost black. Now, in the other layers of tissue, there is nothing to cause such a color, the sign of interruption to the circulation.

At the autopsy, the intestine was found to have descended into the superior orifice of the crural canal, or, to use a better expression, into the upper part of the infundibulum, the orifice of which was very large. The intestines descend here in crowds of persons, but hernia does not take place; there is hernia, if you wish, but no symptoms of hernia. When, however, the intestine is here, in the infundibulum, it can become engaged in one of the small holes of the cribriform fascia, and it is there that strangulation occurs. In this case, the hernia had passed into an opening on the internal side of this fascia.

March, 1854. A woman, who, in M. Nélaton's opinion, was not laboring under a strangulated hernia, although she had many symptoms of it, came into his wards one Saturday. The previous Wednesday, she had been seized with obstinate, frequently repeated vomitings, colics, and constipation. This woman had a hernia existing since infancy, which never had been very large, and never had been retained by a bandage. She several times had suffered under attacks, similar to the one she then had, which would cease when the hernia entered the abdomen. This time, the symptoms continuing, she sent, on Thursday, for a physician, who thought the symptoms arose from strangulation of the hernia. The same condition of things continued during Friday, and on Saturday she entered the hospital.

In the left groin was a tumor, a crural hernia, situated beneath the line, drawn from the anterior superior iliac spine, to the pubic spine. This tumor was somewhat pear-shaped, and had attached to it a pedicle, which, although the woman was quite fat, could be felt running into the abdomen. Although there was great reason for attributing the symptoms, under which the patient was laboring, to the hernia, yet M. Nélaton did not think them owing to it; and he did not, because, in the abdomen, at the sigmoid flexure of the ilium, hard masses of feces were found. An injection, administered on Sunday, brought away masses of feces, and more were still felt in the abdomen. It is well to know that such accumulations give rise to these symptoms, and that, generally, they announce themselves suddenly. The accumulation goes on slowly, and when the intestine becomes irritated, it presses on the feces, and their passage is prevented. M. Nélaton has seen a case of this kind diagnosed as cancer of the epiploon. He also knew of a case, in a man of very high position, and known to many of the students, where for eighteen months there had been a considerable distension of the belly. A physician of great reputation said the case was one of ascites, and treated it as such. One day this patient felt a strong desire to pass his stool, and, placing himself on a sick-chair, he passed two potfuls of stercoraceous matters. After that, he had no more ascites. In the case of cancer of the epiploon, it had lasted three months, and three purgatives cured it. In such cases, you must generally give eight, ten, or fifteen purgatives.

Purgatives were administered to the patient in the wards, and the following Wednesday she was well.[1]

Artificial Anus.

February, 1852. An old man from the country, who had a fistula in the right groin. He said he never had had a hernia, but from the answers he gave to questions put to him, he most certainly was mistaken.

In the month of October, while occupied in spreading manure, he was taken with pain in the groin of the right side; a physician was called, who detected a hernia, and the usual cortège of symptoms of its strangulation followed. Attempts by the taxis, applications of leeches, cataplasms, baths, &c., were made use of for two days, at the end of which time the attending physician renounced his efforts, and called in another. A large incision was made into the tumor, from which, he said, blood and pus came away the same day, but he made no mention of stercoraceous matters; it is possible, however, that they existed without his perceiving them, which he said he did at the expiration of some days. The hole, made by the incision, had gradually contracted.

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[1] The surgeon who would desire to acquaint himself with the ideas of the modern French school, on the most important subject of hernia, could not do better than study the remarkable thesis of Paul Broca, written for the "Agrégation en chirurgie," entitled: "*De l'étranglement dans les Hernies Abdominales, et des affections qui peuvent le simuler.*" Published by Victor Masson, Paris, 1853.

When he entered the hospital, in the groin of the right side, at the level of the crural canal, beneath the ligament of Poupart, was a fistulous opening, of small dimensions, into which a female catheter could be passed; this opening was continually giving passage to fecal matters. When the opening had been larger, matters that could be recognized as having been taken as food, and, above all, the vegetable, used to come away. Soon after his entrance, a leaf of salad came out from the opening, three hours after he had eaten it. The patient went regularly to stool, the passages were good, and of the normal consistence. He was not becoming any thinner.

The diagnosis was a stercoraceous fistula, an artificial anus, corresponding to the small intestine, and consecutive to a crural hernia.

In order to treat these cases, it is well to know the interior disposition of the parts, which varies very much. When the complete tube of intestine, doubled on itself, has become strangulated, and has sloughed away, there will, of course, exist between the sides of the external wound *a spur*, formed by the adhesion of the portion of the intestinal walls, brought into contact. This disposition, however, happily, does not exist in all cases of artificial anus. When the hernia is very small—and these small crural hernias, simple pinches of the intestine, are very difficult to reduce, and often strangulate—it can happen that but one side of the intestine is engaged and strangulated in the aponeurosis. In the present instance, this is what had happened.

It must not be thought, however, that it is easy to close these stercoraceous fistulas. Vivifying the edges, and keeping them in contact, cauterizations, compression, so highly lauded, all frequently fail.

It must be recollected that M. Nélaton was speaking only of the methods of treating fistulas like the one in the wards, and not of the proceedings made use of for causing the disappearance of the partition, of the infundibulum. Velpeau, believing that the great obstacle to the cure of these fistulas is the tension of the parts, makes two large incisions, an inch above and below the opening, and then keeps the edges of the opening together. M. Nélaton said that, three years before, in a case resembling the one at that time in the wards, he had employed a method, the success of which made him strongly inclined to repeat it in this one. The parts around the margin of the external orifice of the fistula were vivified to a small distance, so as to form an oval-shaped bleeding surface; about one inch from the upper border a semicircular curved incision was made parallel to it; the intervening integument was then dissected loose, being left attached at the two extremities, and moved down so as to cover the opening, and there held by sutures. This case succeeded admirably; a fistula altogether capillary, scarcely admitting the passage of Anel's catheter, and through which only two drops of serosity, colored by bile, flowed in twenty-four hours, was all that remained.

An operation, similar to the one just described, was performed in this case. It succeeded quite well, for at the end of two weeks, during one of which M. Nélaton was prevented by sickness from attending his wards, but a small fistula was left. The opening had an oval shape, the greatest diameter was two lines, and but a small quantity of stercoraceous liquid came out; the length of the fistula, or the distance between the external opening and the intestine, was about half an inch. In such a case, cauterization was suitable, and it was necessary to modify the walls of the canal in its whole length. This was done by a red-hot wire, very fine, and having attached to it a ball of iron, as a reservoir of caloric. When the eschar, resulting from this application, should come away, M. Nélaton said his intention was to pass a thread through the tissues, going very near the intestine, and fastening it so as to keep the granulating surfaces in contact.

The third day after the cauterization, in the morning, the man said he had suffered a great deal during the night, complaining chiefly of pain in the head, and of sickness at the stomach. In the neighborhood of the wound were remarked two tracks, red with a scalloped edge, and presenting a kind of relief; the wound itself was more painful to the touch; the man had, evidently, an attack of erysipelas. As regards the abdomen, there was no tenderness, no tension, no sign, in short, that could cause a fear that the erysipelatous inflammation had extended there. Vomiting, accompanying the commencement of an attack of erysipelas, is a thing quite often remarked. The next day the erysipelatous inflammation had extended over a space the size of the hand; in the night, the patient had had headache, bleeding at the nose, and vomiting.

M. Nélaton thought that the proper moment had come for the performance of the operation of which he had spoken, and he said he would perform it, in spite of the existence of this complication. The surfaces were ready, the granulating surfaces had formed, and that day, the fourth after the cauterization, he applied the suture. At some distance from the external orifice, he passed a curved needle very deeply, near to the intestine, and brought it out at about the same distance on the opposite side; then drawing the ligature through, he fastened it to rolls of diachylon. Though this suture did not entirely close the fistula, it nevertheless diminished the size of it. For four weeks afterward, the treatment of the case was confined to the application of simple dressings and to keeping the parts clean. At the expiration of that time, finding the hole to be very narrow, and the edges covered with granulations, a curved needle was passed deeply through the tissues traversing the fistula, entering and coming out about eight lines from the edges of the opening. A ligature was then applied in a figure of eight, as in hare-lip suture, in order to bring the inclosed tissues firmly and closely together. After that the opening was very minute; very little liquid came away, and the man was so well satisfied with his condition, that he did not remain any longer in the wards.

April, 1852. A very old man, who appeared to have had a hernia almost all his life; it was easily reduced, and he had never worn a bandage. Five months before, symptoms, to him extraordinary, made their appearance; he was attacked with colics—he did not remember to have had vomitings—and, at the same time, the tumor became tender, larger, and hard, and he was unable to reduce it; in the course of a few days, it opened of itself. Since that time there had been an opening, from which fecal matters issued. A few days before his entrance into the wards, the man said that a tumor had come out at the orifice, and there remained.

At the fold of the left groin was something which was easily recognized as a turning out of the internal membrane of the intestine. It was very important to determine if this hernia was crural or inguinal; if it was below a line drawn from the anterior superior spine of the ilium to the spine of the pubis, the immense probability would be that it was crural; in this case it was below. This tumor seemed to come out of the skin by an opening, having a diameter of about two centimetres, or nearly one inch. When the parts were explored with a sound, it was found that on the external side of the opening it was impossible to introduce it, that on that side the tumor was continuous with the integuments; on the internal side, the instrument passed into the intestinal canal. This condition of things is not very uncommon; the portion of the intestinal tube united to the external integuments is turned out, just as takes place in prolapsus of the rectum. A few simple diagrams which any one can make for himself, drawn on the blackboard, very much facilitated the comprehension of the processes by which the existing condition of things had been brought about. When the finger was introduced into the opening, M. Nélaton said he could feel what the French call *the spur*, that is that portion of the intestinal tube that became united by the contact of the serous surfaces, when the intestine was doubled upon itself.

In the treatment of the case, the first thing to be attended to was the reduction of the turned out portion of intestine; and for this purpose the patient was kept quiet in bed, and a bandage was applied so as to produce compression upon it. At the expiration of ten days, the hernia had been reduced, and the parts were all ready for the operation M. Nélaton proposed to perform on *the spur*. An intercurrent affection, with which the patient was attacked the day before the one upon which he had decided to operate, forced him to defer it.

It is very important, in performing this operation for the destruction of the spur, to determine with precision the anatomical dispositions presented in the case. The spur separates the superior orifice of the intestinal tube from the inferior; it forms a partition between them; and before operating, the place where the superior and inferior orifices will be found must be known. The fecal matters are thrown out of the superior orifice into a cavity—the *entonnoir*—and come out of the external opening, which otherwise would tend to close. The superior orifice, through which the feces pass, preserves its first dimensions; but the inferior diminishes little by little. The fecal matters are prevented from passing into the inferior orifice by the partition formed by the spur; and until its destruction, so as to render easy the passage of the feces from the superior orifice to the inferior, there is no possibility of closing the artificial anus. Before Desault this was not understood, and surgeons only occupied themselves with endeavoring to effect the closure of the external opening. Desault's method of pushing back the partition, and establishing a communication between the two ends, was by introducing a thick roll of charpie, one end in one orifice, and the other in the other, having a thread attached to the centre. This operation answered well to one important indication, but did not answer to all. Dupuytren acted in a more efficacious manner, by means of a crescent of ivory, having a stem attached to the centre of the convexity; by means of this, and the proper application of a bandage, he exerted a pressure in order to push back the partition. This instrument, however, became displaced, and he was forced to abandon it. A German (Smalkalden?), at the close of the last century, in 1797, was the first who destroyed the partition; he did so by means of a thread carried by a needle, and tied as a ligature. Later still, in 1807, Physick, of Philadelphia, did pretty much the same thing. At last, Dupuytren thought of another operation. He thought that, by the aid of forceps, the surgeon could seize the partition and cause its mortification; the forceps being constructed in such a manner as to determine the same pressure throughout the whole length of the blades. Some other surgeons have thought that it was not necessary to destroy the edge of the partition, and, as for instance M. Blandin, have made a hole through the spur, at some distance from its free border. The idea, however, of these operations, is always the same as that of Dupuytren's operation. Delpech invented some modifications to the original instrument, and M. Nélaton showed the class one of M. Raybard, which holds the walls very well in contact; it is a forceps, having small teeth, and in a groove in the blades a knife can be made to glide, in order to cut the partition. M. Nélaton intended to make use of the instrument of Dupuytren; he had seen it made use of very many times, oftèn by Dupuytren himself, and very rarely had he seen any accident to result. In ten or twelve hours, after the fall of the instrument, which takes place usually on the eighth day, there is a fecal passage through the anus. The patient having an attack of pneumonia at the base of the right lung, it was necessary to wait for his recovery.

At the end of four weeks from the commencement of this attack of pneumonia, after a great deal of suffering, the old man died. Other accidents had taken place, excoriation and sloughing of the parts covering the sacrum, and, after that, of the parts in the region of the right trochanter. At Bicêtre, where there are aged patients, who never leave their beds, M. Malgaigne has remarked the absence of eschars in these parts; but he has remarked, also, that if one of these bedridden patients was seized with fever, with the febrile movement attending a pneumonia, for instance, that then these excoriations would be formed. At the autopsy, it was found that the hernia was one, almost cæcal, of the left side, which it is not very uncommon to find. The hernia had been of but one side only of the intestine, and there was no spur, no partition, as he had supposed, formed by the adhesion of the other sides of the tube, brought into contact when inflamed. The ilium had been strangulated but a very short distance from its entrance into the cæcum, and it was the angle formed by the junction of these two portions of intestine that had given the sensation of a spur. The superior end of the intestine was filled with liquid fecal matters, the lower end was empty.

In April, 1854, a child, new-born, was brought to the hospital, as having no anus, from imperforation of the rectum or absence of that intestine.

M. Nélaton established an artificial anus in the left iliac fossa. In performing the operation, the integuments were divided, then the muscles one after the other; the peritoneum, thus exposed, was opened, and the intestine was drawn out by the finger, and fastened to the opening in the abdominal walls by means of a thread. The intestine was then opened, freed of the matters it contained, and the wound dressed by charpie, and a loosely applied bandage placed around the body. The child, however, died in the afternoon.

CHAPTER XX.

AFFECTIONS OF THE GENITAL ORGANS OF THE MALE.

Stricture of the Urethra.

MARCH, 1852. A young man entered the wards to undergo treatment for a stricture situated in the membranous portion of the urethra. The stream of urine was very small, and it could only be voided by great effort.

At the commencement of the treatment, the introduction of the bougie was attended with much difficulty. M. Nélaton called attention to the advantage of curving a little the fine extremity of the instrument; if it be left straight, it will necessarily touch but one point, but when this curve has been impressed upon it, if the instrument be gradually turned, it must finally be brought against the orifice. The cork-screw extremity to a bougie, about which so much has been said, is nothing but this.

In this case, the instrument was left in the stricture every day for one hour, each day the size being increased. By degrees the canal was sufficiently enlarged, and the patient went out, being enjoined to continue for a long time the use of bougies. The bougies used were made of gum elastic.

November, 1852. A young man, of good constitution, and apparently strong, who presented quite a curious stricture of the urethra. In the month of February, of the previous year, he had his first attack of gonorrhœa. He went to an apothecary, who gave him injections, and afterwards capsules; after using the capsules for some time, the injections were recommenced. By these means, the running appeared to have almost ceased.

After the attack, however, the patient observed that his penis, while in a state of erection, was curved, and on this account he consulted a physician. He was told he must break the cord, and as a way of doing so, cohabitation with a woman was advised. In the act of copulation, the penis got straight, and after it much blood ran from the meatus urinarius; for some days, some blood always came away after making water.

After that time, he remarked that the urine passed in but a small stream, sometimes only drop by drop. He again applied to a physician for advice, who made use of bougies, and even succeeded in introducing some of a very large size. These bougies were kept in the urethra for a long time, one of them for two months. It was noticed, however, that, even after this long sojourn, the urethra contracted upon itself, and that the introduction of the bougie again was as difficult as it had been at first.

When this patient came in, M. Nélaton was not in attendance, being absent in vacation. Bougies were introduced, commencing with the smaller, until one, one-fourth of an inch in diameter, entered with ease, but the foreign body was scarcely removed, when the urethra again contracted. An incision, embracing the whole thickness of the walls of the urethra, was under discussion when he resumed his duties.

At that time, although the patient was wearing quite a good-sized catheter, in ten minutes after it had been withdrawn by M. Nélaton there was extreme difficulty in passing the urine.

M. Nélaton said he was not a great believer in elastic strictures. He was for a moment inclined to believe in the existence of a valvule at the neck of the bladder, though they are formed more rarely than is said. By searching, however, he could find nothing to warrant such a belief, in this instance. A valvule of the canal could very well be admitted after the tear that had taken place in the urethra, and the patient had always said that it was not necessary to pass the catheter as far as the bladder, but only beyond a certain point. The exploring instrument of M. Amussat was introduced. This consists of a stem pierced from one end to the other by a hole, which is not in the centre, but near the side. Through this hole a wire is introduced, which is attached to the movable rounded extremity of the instrument. It is easily understood that, after the instrument is introduced as an ordinary catheter, by turning the wire, its extremity will be made to project and form a kind of hook, for the hole not being in the centre, when the large radius, so to speak, is turned in another direction, the edges will no longer correspond. The urethra was explored by means of this instrument, but no valvule was detected.

It was then determined to treat the case as one of ordinary stricture, and by the method of Béniqué, that is to say, by introducing a number of bougies, differing but slightly in diameter, one directly after the other, at the same sitting. After five or six had been passed, the size being very gradually increased, a sensation was had as if a small, hard body, a calculus, existed very near the stricture. M. Nélaton touched it seven or eight times, in a manner sufficiently plain to convince himself that a small calculus existed there. He believed that it had introduced itself into the urethra, and had made its way along the canal, but, instead of coming out of the extremity of the penis, as they generally do, it had been arrested by the stricture, and there was forming a sort of valve. It will appear singular, that, when a calculus is arrested in the urethra, it is not encountered every time a sound is introduced into the bladder, but M. Nélaton supposed that behind the stricture was a sort of pocket, into which it went when the instrument was introduced, to come out again as soon as it was withdrawn. To fix the possibility of this in the minds of the students, he related the following anecdote: A surgeon was attending a patient for a stricture, at the time when cauterizations were the fashion; the patient was then cauterized five or six times, until, fatigued by the treatment, he consulted Dupuytren. As the sound was being introduced, when it came to the strictured portion, the patient asked him if he did not feel something hard there. "I do," said Dupuytren, "for it is a stone;" and the stone having been extracted, the patient was soon well.

In order to extract the calculus he supposed to exist behind the stricture, M. Nélaton said he would employ the instrument he uses to extract fungosities from the uterus, the curette of Recamier. He said that there might be there a foreign body, of another nature, that it was rigorously possible that it was not a calculus.

For more than a week, this patient was daily examined, the explorations of the urethra being modified in every conceivable way, and M. Nélaton commenced to doubt more and more as to the correctness of the diagnosis of a calculus, or other foreign body, behind the stricture. The surgeon is often called to see children, with difficulty in making water, and swelling of the penis, depending upon the arrest of a calculus in the urethra, just behind the meatus urinarius. Generally, nothing is more easy than to make the calculus come away, or to break it with the forceps. In the diagnosis of calculi in the urethra, the history of the case, and the sensibility of the patient, are generally sufficient. It cannot always be felt externally, and supposing it to have sojourned there some time, there is an inflammation of the surrounding tissues, which hides it. If a sound be introduced, you can be deceived by the sensation, just as you can with calculi in the bladder; the quick passage of the instrument over a *bride* can give the sensation of a stone.

When, in this case, the favorite plan of Civiale was followed, the introduction of a wax bougie, the instrument showed the marks of a stricture, and also some other marks, but they were not sufficiently *frank* to permit of any determination from them. Moreover, a small sound passed without giving the sensation of a stone, while a large one gave it. This looked like a stricture. Search was also made for a foreign body by the *curette articulée* of M. Leroy d'Etiolles, and by Hunter's forceps, but none could be detected.

Unable to verify his first diagnosis in this case, M. Nélaton treated the stricture by introducing bougies of gum-elastic, rapidly, one after the other, the successive increase in diameter being one-tenth of a line, until No. 53, whose diameter is very nearly four and a half lines, was introduced. Bougies had been previously introduced into the urethra, as has been related, and allowed to remain for two months, without any benefit resulting. After the treatment by Béniqué's method, however, there was a change—he urinated very easily, and the jet did not diminish.

Although the stricture was dilated, yet as there was also there a number of tears of wounds, these would, by cicatrizing, stricture the part again. To prevent this, every day a bougie, No. 53, was introduced for some time, and when the patient went out, he was enjoined to introduce it every two days, then every three, every week, every fifteen days, &c. If he had the patience to follow out this advice, M. Nélaton said he was satisfied that at the end of a year the stricture would have very little tendency to contract. The period of retractility of cicatricial tissues can be passed, but many months are required.

January, 1854. A man, thirty-one years of age, and very strong, entered the hospital with a stricture, the result of a wound; it was very narrow, and the introduction of the catheter was very difficult.

In 1827, when about fourteen years of age, a *gamin* gave him a kick from behind, in the perineum. He did not complain much of it, but his mother, seeing him walk with his legs widely separated, took him to the hospital. He remained there some time, but he did not recollect what had been done to him. Ever since that time he had had difficulty in urinating.

Just before his entrance he had been working very hard, and was seized with intermittent fever, and it was to this fact that the attention of the students was called. When a stricture exists, an excess in work, in strong drink, or in sexual intercourse, may give rise to paroxysms of intermittent fever; chill, followed by fever and perspiration. In the present instance, the chill lasted from one to three hours.

In the course of the past year, M. Nélaton said he had been called to see a patient, occupying quite a high station, who had these paroxysms. He had a stricture of the urethra, and the attacks of intermittent fever always followed the same cause, fatigue. His diagnosis was, that they were owing to the condition of the urinary passage, and, for the treatment, he advised its dilatation. The patient refusing to submit to this, M. Denonvilliers was called in, who advised the same thing, and it was again refused. Trousseau was called in, with the same result, and Chomel also. "Cure the stricture," every one said. Several others were called in, and tired, at last, of the uniformity of judgment, so unusual in physicians, the gentleman sent for one who pleased him. It must be remembered that, during all this time, he was trying change of air, watering-places, sea-bathing, quinine, and everything, all to no effect. This physician, last called in, advised beefsteak and Madeira wine, which were continued for several months, so that the effect on the stricture may be imagined. The patient sent again for M. Nélaton, having at last made up his mind to submit to his treatment. The urethra was in such a condition, that it was only at the end of twenty days that he was able to pass a filiform bougie; every one of these days he had a paroxysm, as usual. The first day after the passage of the fine bougie, he had an attack, the next day he had one, also, but since that time he has never had any.

When the patient was cured, the physician who had prescribed the wine and beefsteak came to demand his fee. When called in, he had demanded 4,000 francs for the cure; but, after some discussion, it was agreed that he should receive the tenth of what his patient would gain at the races. The gentleman had gained 100,000 francs, and, therefore, 10,000 were demanded of him. When this was refused, the physician brought suit against him, pleading that in his case there had been a local evil, and a general evil; the local, M. Nélaton had cured, but the general, he had cured. The tribunal gave him 4,000 francs; it found such pleading to its taste.

As soon as the dilatation of the stricture was commenced, in this case, the man was free from his paroxysms, and although he remained in the wards for four weeks, he never had another.

Fistula of the Urethra.

November, 1851. A man, fifty-seven years of age, who had behind the scrotum a tumor, in which there was a fistulous passage conducting to the urethra. From his history, it was apparent that a stricture had long existed in the urethra, behind which the urine rested and became altered, so that the membrane in contact with it became inflamed and lost its elasticity.

In these cases it sometimes happens, though it is but very rarely, that the patient, making great efforts to empty the bladder, bursts the membrane, and the urine is suddenly and violently extravasated into the neighboring cellular tissue. But generally, as in the present instance, the extravasation is slow, the urine penetrating little by little, it may be but one drop, into the cellular tissue, where a cyst, a sort of pocket, is formed for it. This same slight extravasation, with the consequent formation of a cyst, can take place as well in a fistulous passage as in the urethra. In this patient there was one of them.

March, 1852. M. Nélaton performed an operation for the relief of a fistula, in a man who had been in the hospital for two years. The case was a peculiar one, there being no prepuce; and the testicles never having descended, the scrotum was but a fold of the skin. By an injury he had received, there had been a vast destruction, to the extent of more than two inches, of the under portion of the penis.

When M. Nélaton commenced his duties in the hospital, about one year before, he found this patient presenting, on the under surface of the penis, two openings, one, the larger, four-fifths of an inch in length. These openings were owing to a loss of substance in the skin forming the inferior border of the urethra, and they were separated from each other by a portion of skin, about a quarter of an inch in breadth, that had remained.

In his operation for the restoration of the urethra, an incision was made through the skin, at a proper distance, on each side of the fistulas, and longer than they were. The skin then having been dissected up, on the intermediate portion, where the lower wall of the urethra had remained, as well as at the sides, the edges corresponding to the fistulous openings were brought together, and maintained there by sutures. After this, the catheter was introduced three times every day, for happily the patient was able to retain his urine a long time. The two following nights he had erections, but the operated parts were not injured by them. The sixth day of the operation, when it seemed healed by first intention, the parts were attacked with erysipelas, a complication which almost always compromises these operations; the penis was first attacked, and it afterward extended into the inguinal regions. When it had passed off, a very small opening remained, which was healed up in about six weeks, by repeated applications of caustic, and, finally, by transfixing it with a needle, and bringing the edges in contact with each other by means of a thread wrapped around it in a figure of eight.

December, 1852. A man about fifty-five years of age entered the hospital on account of an affection of the urinary passages, the result of an injury. Two weeks before, while trimming some trees, at a height of fifteen or twenty feet from the ground, he fell and struck the earth in such a manner that it was only the ischiatic tuberosity of the left side that was struck. There was no loss of consciousness, and he mentioned a circumstance of very great importance, namely: That, in endeavoring to raise himself, he felt a noise in the pelvis; he said it went *crock*. Wishing to see where he was injured, he found in his pantaloons about a wineglassful of blood that came from the penis. He was at that time in the country, and by the time a physician came he was like a madman, from inability to pass his urine. After some attempts the catheter was introduced into the bladder, from which they were obliged several times to withdraw it, in order to clean it of the clots of blood that stopped it up.

M. Nélaton said he did not know what had been the matter in this case; perhaps there had been a rupture of the urethra. He had seen many such cases, several of which occurred by falling astride of the side of a boat. After the rupture there is generally retention of urine, and in some cases the catheter enters with most discouraging facility into the tear.

For ten days after the introduction of the catheter the urine was passed without trouble, but since then the canal had again closed. After several fruitless attempts were made in the country to reintroduce the instrument—attempts followed by a flow of blood from the urethra, the man was brought into M. Nélaton's wards.

When he came in, the bladder was seen to be very much distended. The finger being introduced into the anus, the prostate was first felt to be very large, and then being applied against the bladder, *the wave* of the liquid was felt when percussion was made upon the abdomen.

To explain the series of accidents in this case, and first, the issue of blood from the urethra, directly after the accident, M. Nélaton's first thought was that there had been a fracture of the ascending portion of the ischium. When it was explored from the exterior, there was exaggerated sensibility, and apparently augmentation of volume, but the latter could be owing to an increase in the size of the neighboring parts, and not of the bones. The thumb in the anus, the ischium was thus touched, almost naked, and an angular projection was found, not very considerable, but sufficiently so to make him say that there was a fracture very near to where the ischio-cavernosus is found, very near to the urethra. In cases of fracture in this position, some fragments of bone have been seen to penetrate the urinary passages. In one case, in his own private practice, occurring in a female, M. Nélaton saw the fracture, with projection of an osseous fragment into the urethra, caused by the passage of a carriage, and here the fragment was extracted, and recovery took place.

In the present instance there were no signs of the existence of a splinter of bone in the urethra. The tear in the urethra can take place without any fracture, by another mechanism, by the parts behind the scrotum coming violently in contact with an object. This is not very uncommon, and it is in this way that M. Nélaton was disposed to think it had occurred in this case.

At all events there was here a stricture of the canal of the urethra, and of a very bad kind. When the urethra was examined exteriorly, in the penian portion, it had its normal dimensions; the same was true of the scrotal, but behind that, a hard cord rather than a softish canal was found, and the determination of this fact made M. Nélaton say that there would be great trouble in dilating the urethra. In the first place he would introduce a catheter, and allow it to remain, from time to time changing it for a larger. If that was not sufficient, he would make use of the method of M. Reybard, of incisions in the urethra.

In order to see if the sacro-iliac articulation had been sprained in this case, several questions were put to the patient, from which it appeared that he had experienced, and was still experiencing, pain in that part.

It was found to be impossible to introduce the catheter into the bladder, and the day after his entrance the case was so urgent that the puncture of the bladder was made in the hypogastric region. The patient died the next day, and the question was, What was the cause of death? M. Nélaton said it should be known that the operation he had performed was not one of gravity—that he had performed it several times, and nothing had ever followed it; eight or ten times, at least, and never the smallest accident. M. Malgaigne calls it a stroke of the sword in water. Here, there had been a tear of the urethra, attempts to introduce instruments, and prolonged retention of urine. The man was dead from an infiltration of urine into the cellular tissue of the pelvis, and the question was, whether it came from a hole in the back part of the urethra, or from the puncture. Unfortunately, this question could not be answered, for no autopsy could be made.

July, 1853. A very interesting case of fistula of the urethra came into the hospital, in a stoutly built man, about thirty years of age. The causes were very obscure, all that was known was this, that for very many years there had always been a small fistula in the furrow separating the penis from the scrotum. The important part of the case, however, so far as the treatment was concerned, was the study of his condition at the time he entered. Just anterior to the scrotum was an opening into the urethra, an elongated slit in the direction of the axis of the penis, about five lines in length. In the bottom of the opening the lining membrane of the urethra was seen, of a lively red hue.

The man said that, about two months before, an attempt had been made to cure him of his fistula. The edges had been vivified, and kept in contact; but cicatrization did not take place. Very abundant suppuration followed, and the opening, from being but one line in length, had increased to five times that size.

The patient passed his urine well, and the catheter was introduced into the bladder with the greatest facility. It was not on account of any difficulty or annoyance in urination that he had entered the wards, for he closed the hole by applying a finger; but what occupied him was his genital performances, for the seminal fluid all came out of the fistula. This is understood by the fact that during erection all the parts are compressed, and the sperm being forced on from behind, must issue by the first opening. It was on this account he demanded an operation.

In the treatment of urethral fistulas, a distinction must be made between those before the scrotum, and those opening into it, or behind it. In the former, there is a hole, a button-hole; in the latter, there is a canal, more or less long. This long canal always exists when the fistula is formed behind the line between the scrotum and the penis, and in such cases there is a great tendency to get well, the re-establishment of the flow of the urine is generally sufficient. It is another thing altogether in front of this line, and the closing of fistulas in that portion of the urethra is extremely difficult. It is true that attempts have been made before; but it is only since the works of Dieffenbach, of Sigalas, and of Ricord, that large fistulas have been successfully closed. M. Nélaton said that, although his mind was made up, yet he would soon take occasion to discuss the various methods of operating for the cure of this affection.

The summer vacation commencing at this time, I left the city, and on my return, at the end of two months, the patient had left the wards. About six months after his first entrance, in the month of January, 1854, this patient came in again, with his fistula, just about as it had been before. He said that M. Nélaton had operated upon him a few days before the vacation, and had then left him in the care of his substitute. He said he had suffered a great deal; that the surgeon replacing M. Nélaton undid all that had been done; and that, after a stay of fifty-five days, he had gone out, without having gained anything. This time, M. Nélaton was absent from sickness, and M. Richard was supplying his place. This surgeon performed an operation for the cure of the fistula similar to the one performed in the summer, after M. Nélaton's method of autoplasty *by bridge* (*par pont*).

In operating for the cure of hare-lip, Malgaigne's method was not to remove any portion of the substance of the lip; but, commencing a few lines from the free edge of the lip, he carried his incision up to meet a similar one on the opposite side, just over the top of the opening in the lip; this done, an incision was made in the angle of the inverted V, so as to form two flaps, which being only attached by a small pedicle, were turned down and their bleeding surfaces placed in contact. M. Nélaton had the happy idea, and it seems strange it had not occurred before, of turning down the V without cutting it through at the angle, so that only a hole is left to be filled up, and there is a *living suture.* The method has been applied to staphyloraphy, and M. Nélaton has also made use of it in cases of artificial anus. M. Richard applied it in a case of the last degree of epispadias, a case of turned out bladder. He first made a flap from the abdomen, large enough to cover the whole surface of the bladder, and turned it directly down over it, so that the bleeding surface was anterior, and the external surface of the skin corresponded to the mucous tissue. He then dissected up a curved flap, from the integuments at the sides and from the scrotum beneath, and leaving it attached at both ends, he slid it up and applied its bleeding surface against that of the first flap, turned down from above. The patient did very well until the ninth day, when erysipelas took place, followed by peritonitis, and the patient died. At the autopsy, it was found that a great part of the cut surfaces had united.

Without the aid of plates, it is very difficult to make these operations understood. The *living* suture was made from the scrotum, and, having been properly placed, was left, unattached by any suture; a catheter being left in the bladder, slight external bandages were sufficient to keep the parts in position. Lupulin was given to this patient for the purpose of preventing erections, but it seemed to have no effect, so far as they were concerned.

When M. Nélaton resumed his duties, on the sixth day of the operation, he found everything most favorable; everything indicated the closing of the fistula. When the suppurating part corresponding to the old fistula was well wiped, a drop of liquid would be seen to appear, coming from the urethra; in place of a fistula half an inch long, there was an orifice so small as scarcely to be perceptible. Through this an insect-needle was passed, and a thread arranged in the figure eight, as in hare-lip suture. This needle only rested in place for forty-eight hours, and in fact it is but rarely that one can be left for more than twenty-four in an inflamed part without producing destruction of tissue. The small hole still remaining, another needle was passed, upon withdrawing which it was found that the sides of the hole had united, from the state of permanent junction in which they had been kept. The patient remained in the hospital altogether nearly four weeks, and was perfectly cured.

November, 1853. A cab driver, and, of course, a man but slightly endowed in an intellectual point of view, of whose case it was very difficult to learn any details. He was thirty-seven years of age, and when twenty-one had had a gonorrhœa; he had symptoms of chordee, and said he had broken the cord by mounting his horse, and that much black blood had escaped from the penis, and continued to do so for some days; after that, he knew but little of himself. About fifteen years before, he had com menced to perceive that he did not urinate well. Five years before, his scrotum became very voluminous; it was large when he came into the hospital, but he said it had been at that time *much* larger. He went into the Hospital Necker, where they made many incisions into it, of which the traces were still to be seen. He left the hospital pretty well, and with a sound to make use of; which he did for some time, but having renounced its use, he found himself unable to introduce it when he wished to. He said he was certain that the fistulas in the scrotum had never ceased to pass urine. There were many other things important to know, but this was all that could be learned of his case from the patient, who was far from being intelligent.

When he entered M. Nélaton's wards, the scrotum was voluminous, its tissues hardened, not œdematous, and containing projections and anfractuosities, from which water flowed. The hardness of the tissue was most striking, and, in a mass as large as the four fingers folded together, it could be felt penetrating deeply into the perineum, to the urethra.

The cause keeping up this condition of things, was, what might be expected, a stricture. This stricture arrested a bougie for some time, after which it went pretty easily into the bladder.

There are some distinctions to be made in these cases of fistula, according as they occur suddenly or slowly. When slowly, it is in this manner: the urethra behind the stricture becomes distended and altered, often softened, fungous and vascularized; at last it tears, and a urinous infiltration takes place. If the tear be large or small, of course there will be differences in the symptoms. In some, the patient feels a desire to pass his water, and feels his bladder empty itself, and yet, to his astonishment, none escapes from the penis. In order that the extravasation be very great, the contraction of the bladder must be very energetic. The violent projection of the urine in the cellular tissue of the perineum, can be prevented by the existence of a large prostate; in this case, the prostate was large, and the infiltration had been slow. If the quantity of urine infiltrated be but small, it can be absorbed. There is, then, as is easily seen, a huge difference in these cases.

The first thing to do, in the treatment of this case, was to render the urethra free, and had the man been intelligent, and able to aid the surgeon by using well the catheter, there would have been no doubt but that his fistulas would get well. When the patient is sufficiently intelligent to sound himself, the instrument need not be left in the bladder; by introducing it every two or three hours, any urine can always be prevented from going into the fistulas. The indurated tissues could retard the cure of the fistulas, but not prevent it; in thirty days, if the urine could be kept from flowing through them, they would be only one-fourth the size they were on his entrance. Even in the most complicated of these cases, the surgeon should never despair.

This patient remained in the wards a long time, some five or six months, and, at last, went away, cured both of the fistulas and of the indurations.

December, 1853. A man, about fifty years of age, entered the wards for a furuncle, situated on the calf of the leg, attended by angeioleucitis and erysipelas. The advance of the erysipelas was tried to be checked by the application of a blister, but the next day the skin beyond was covered with the disease; as to the part itself, covered by the blister, of course nothing could be said. A second, and a third blister, in like manner completely failed.[1]

Some days afterward, M. Nélaton remarked that the scrotum was swelled, but it did not sufficiently arrest his attention, for which he blamed himself very much afterward, for he lost twenty-four hours in a disease not admitting of such delay. The next day it was larger and more red, and, seeing that there was evidently something there not explainable by what had been noticed before, he interrogated the man about it.

The patient said he urinated very well and *very often*, and this is an answer often given in these cases. Three years before, he had retention of urine, and ever afterward his desires to urinate were frequent. A sound being introduced, a stricture was found seated near the sub-pubic curve of the urethra. There were pain, redness, and swelling of the scrotum, and in the perineum a symptom more characteristic still of the affection. In the normal state, in the perineum, a relief is seen of the urethra; here it did not exist, and to one having present in his mind the disposition of the aponeurosis, there was evidently a collection of liquid, or, to come to the point at once, of urine. An incision was made at once into the part, and the urine came out, but there was high inflammation of the parts where it had been infiltrated. The next day large incisions were made, and the next the subcutaneous cellular tissue was seen white and gangrened.

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[1] See page 35, Furuncle.

M. Nélaton said he had been guilty of a great fault in this case, in not having examined the perineum the very first day. He would then have found this relief, this projection, and opened it. The determination of this projection is enough—there must be no waiting after that; whenever there are incontestable signs of an affection capable of arresting the flow of the urine, and in the direction of the perineum a projection, it must be opened at once.

The treatment of the case, of course, was to re-establish the flow of the urine by the urethra. In four weeks, a large catheter easily passed the stricture, and ten days after that he went out well.

Epispadias.

July, 1852. A young man, a Swede, about twenty-five years of age, came to Paris, in order to place himself under M. Nélaton's care, in the hospital. He bore the marks of operations, practised for the relief of his affection in Stockholm and London.

The penis seemed cut open from its superior face, and spread out, a groove in its length representing the floor of the urethra, and the urethral orifice being in the angle of its junction with the abdomen. Standing or sitting, in bed or out, night or day, the urine was constantly flowing out of this orifice.

In the hope of relieving in some measure this distressing condition, the following operation was performed upon the patient. On each side of the groove on the dorsal face of the rudimentary penis, a flap was dissected up and turned aside; above the urethral orifice, from the hypogastric region, another flap was then dissected, which was turned directly down over the back of the penis, its bleeding surface upward. The two side flaps were then turned back again, so that their bleeding surfaces were placed in contact with that of the flap from the hypogastric region, and they themselves fastened together by sutures. In order to destroy the tension of these two upper flaps, an incision was made on each side of the median line on the under surface of the penis. A catheter was introduced along the groove, between it and the reversed skin, into the bladder, and a bladder containing pounded ice was placed over all.

The two side flaps did not unite well with each other, and the patient remained in the wards a long time. The flap from the abdomen reduced itself to a very little thing indeed; but, after all, the length of the urethra was increased at least the four-fifths of an inch. When he left the hospital, he no longer urinated when seated, or in bed, but when walking he did.

I met this patient six months after he left the hospital, and he was then quite comfortable. As said before, the urine only flowed when he was walking, and the length of the penis had been rendered sufficiently great by the operation of M. Nélaton to permit of the application of an India-rubber tube that was continued down to his ankles, inside of the pantaloon. He urinated then at proper intervals by turning a screw over his shoe.

December, 1852. A case of epispadias, in a stout, healthy looking boy, nine years of age, was brought into the wards from the country. In this case, there was, what is often seen in such cases, a want of the symphysis pubis; in touching the interval left between the bones, the resistance of a fibrous membrane was felt. The orifice of the urethra was in the angle where the penis joined the abdomen; and from it a groove was continued to the end of the penis. Under the penis was a great abundance of prepuce. The patient could not hold his urine, or but for a very short time.

This boy could not go to school, he could not be an apprentice, and, besides, he was always suffering with sores and pustules, where the urine came in contact with his skin. Something was to be done; it was not a case to look at with folded arms. It was not in order to make a penis proper for the act of copulation that an operation was to be performed, but to enable the patient to hold his urine; and if not that, at least to have some apparatus applied.

The first, the simplest idea, in these cases, is to bring the sides of the groove together; but this always fails, as of course it must, for the operation is against the first principle of anaplasty, that there be *no stretching of the flap*. Again, there are almost always erections after operations upon the penis, and they would inevitably destroy everything.

The failure of the junction of the two flaps from the sides of the penis, in his last operation, induced M. Nélaton to perform this one somewhat differently. The skin at the sides of the groove was dissected up, and a flap from the hypogastric region turned down as in the other case, and fastened to the side flaps by three sutures. Under the penis, and at the side of it, two curved parallel incisions, at some distance from each other, were then made, and a flap attached by both ends was thus dissected up. This flap was then slipped over the penis, so that its bleeding surface was in contact with that of the one brought from the hypogastric region; the superabundance of prepuce below supplied its loss. A catheter was introduced, and left in the urethra, and a stream of water made to flow constantly over the parts.

The flaps, at first slightly bluish, soon acquired their natural color. Some fears might have been entertained of the effect of the contact of urine with the bleeding surfaces, but nothing happened. The points of suture were removed at the end of forty-eight hours, for they are foreign bodies, of which a wound should be freed as soon as possible.

The boy remained a very long time in the wards; the parts were attacked with erysipelas soon after the operation, and a small opening, a short fistula, formed itself at the angle of the flap turned down from the abdomen, that was very long in closing. When he went away, the urine only flowed away when he walked about, and even then he could hold it for a short time. The urethra might have been made longer by another flap from the scrotum, but it was thought better to supply the boy with an apparatus, such as that worn by the other boy, before mentioned.

July, 1853. A young man presented himself, in whom the penis could scarcely be distinguished from the mass formed by the scrotum. Its dorsal surface was cleft, and behind it was an opening, through which the finger could be introduced into the bladder. In epispadias, the bones of the pubis are generally imperfect; not only do they not touch each other, but the pubic arch does not have its usual height.

The young man was tormented with incontinence of urine, except when in bed, when he was able to hold it.

M. Nélaton remarked, that to stop the urine it was sufficient to exercise a pressure from below, against the ligament, between the ossa pubis. He had, therefore, an apparatus constructed like the one for prolapsus ani, by means of which the urine was retained, and the pressure was so slight that the patient could force it out when he desired it.

In these cases there is no possibility of making a penis fit for generative purposes, and he remained satisfied with what he had effected by his bandage.

Abscess of the Prostate.

June, 1853. A young man, who, about six weeks previously, had a severe attack of gonorrhœa, the symptoms of which had been very much aggravated by the influence of white wine, that a friend had advised him to drink. The man, who was very laborious, was unable to continue at work, lost his appetite completely, and was obstinately constipated. This state of things having lasted for six days, he entered the hospital. At that time there was no discharge from the urethra. A catheter had been immediately introduced, for he was suffering from retention of urine, but M. Nélaton could not ascertain if the introduction had been difficult or not.

The finger being introduced into the rectum, the volume of the prostate was found to be almost four times greater than is natural, and, at the same time, the sensibility was exaggerated, the contact of the pulp of the finger being very painful. The patient insisted a great deal upon the pains he felt at the fundament, and in affections of the prostate, they complain there rather than of the urinary organs.

This accident, inflammation of the prostate, is not a common one, yet it is more so than is supposed, because the diagnosis is not made out with sufficient care. It is not seen at the most acute degree of the inflammation in gonorrhœa, but afterward, as is the case with orchitis; the inflammation, as it continues, progressing to the parts more deeply seated. The mechanism, in such cases as this, is probably the progression of the inflammation into the canals of the prostate, that are seen far back in the urethra.

The man was bled locally, very copiously, by the application of thirty leeches to the perineum, and his condition was greatly ameliorated.

M. Nélaton said it was very probable that an abscess would form, and exploring the organ, in order to determine its density, it appeared to him that the left lobe was larger, more painful, and more soft than the other. This abscess, if there was one forming, would open into the rectum, or into the urethra; when about to open into the urethra, such abscesses give rise to symptoms of dysuria; carried to an extreme degree, when into the rectum, to those of tenesmus. In this case, M. Nélaton thought it would open into the rectum.

The third day after his admission, early in the morning, in bed, he was taken with a most pressing desire to pass both his urine and his stool, and from the urethra he passed a large quantity of pus, without any mixture of urine. The relief at once was extremely great, and the following day the man was perfectly satisfied with himself; he felt perfectly comfortable.

These abscesses of the prostate can go in various directions, but they generally, as here, go to the prostatic portion of the urethra. This termination is, by far, the most frequent. At other times, they go to the rectum; they have there to overcome the fibrous envelop of the prostate and the coats of the rectum, but it is, nevertheless, the most frequent termination after the other just mentioned. At other times, they open into the perineum, and again, at others, into the bladder.

This termination of the abscess by opening into the urethra, quite commonly brings about a speedy cure; but the *possibility* of an accident must always be borne in mind. There is a hole in the urethra, and if its direction be such that the urine is with difficulty permitted to enter, all goes very well; but if otherwise, the urine enters, and the case becomes very troublesome. The man was told never to urinate; but whenever he had need to do so, to have a catheter introduced.

As this exposes the patient to having the point of the instrument introduced into the hole, which would thus be prevented from healing, it might be asked if it would not be better to leave the catheter remain there. That depends upon circumstances; in the hospital, the catheter could be introduced at any moment by an intelligent person, and M. Nélaton, therefore, preferred this; for when a catheter is left, the urine passes through it, it is very true, for the first twelve hours, but after that the urine flows away between it and the walls of the urethra, the catheter acting, so to speak, as a conductor. In the forty-eight hours, after the bursting of the abscess, the patient urinated three times without the catheter, being unable to wait. No harm, however, resulted, and he got well without any trouble.

Inflammation of the Dorsal Vein of the Penis.

February, 1854. A young man, in the vigor of life, entered the wards with quite a rare complication of gonorrhœa. When it appeared, he had had the clap for about eight weeks; as a general rule, it comes much sooner.

On the back of the penis, from the root of the glans to the root of the penis, was a cord, easily felt and easily separated from the other tissues; the cord itself was hard. This cord was owing to an inflammation of the dorsal vein, adhesive, and with coagulum.

This phlebitis is never followed by any general symptoms; the only thing is an œdema of the dorsal part of the penis, as was seen in this case. In some cases, it gives rise to excessive pains, for when there is chordee, the organ cannot be flexed to relieve the tension of the parts.

M. Nélaton said that, in the course of time, the coagulum in the vein would disappear, and completely so, so that in the course of a few weeks it would be seen to distend itself with blood upon pressure at the root of the penis, as it does normally. It is here that the phenomena following what is called "*adhesive phlebitis*" can be best studied.

The patient got tired of the confinement of the hospital, and went out after remaining but a few days.

Cancer of the Penis.

May, 1852. A middle-aged man entered the wards, in whom the appearance of the disease was to be believed rather than his history. He said that, eighteen months before, he had a chancre, to which some salve was applied, and it got worse; he went to a surgeon, who cut it away, but the evil still continued; it was afterward cauterized, but still it grew worse.

When he came in, there was a vast ulceration at the anterior part of the penis, having a large solution of continuity behind, bleeding, and with all the characters of cancer. The ulcer, extending as far back as the middle of the penis, had for its base the fibrous envelop of the corpora cavernosa. The frænum was ulcerated on both sides, and hard. In the left groin was a hard mass, ulcerated, and as large as the palm of the hand; on the right side were also hard masses, but they were not as yet ulcerated. It was evidently a cancer of the penis, and, as has been remarked, chiefly by Lisfranc, it was arrested, as it were, by the fibrous tissue. Very often the canal of the urethra is compressed, but here it was not; the patient urinated as well as if nothing were the matter.

In such a case as this, the surgeon must resign himself to do nothing. If the penis were cut away, the masses in the inguinal regions would be left; and if an operation be made when two or three glands are found in the inguinal or axillary region, after the cut has been made they will be found everywhere; and the surgeon is compelled to close his operation with the feeling of having done nothing of use. When the ganglions are felt to be affected in either the inguinal or axillary regions, the knife should never be applied to a cancer. *The surgeon must know how to resign himself.*

Inflammation of the Testicle.

April, 1853. A man entered the wards with an affection of the testicle, that is not a common one. Four years before, he had been operated upon for stone in the bladder, by lithotrity, the instrument being introduced several times. The breaking out of the cholera drove him from the hospital; he imprudently walked about a great deal, and was attacked with orchitis. As a result of this, abscesses formed, which were opened, and little by little the whole testicle was destroyed.

The same thing took place while the patient was in the hospital, in his other testicle. When he came in, there was tumefaction of the vas deferens, of the epididymis, and of the body of the testicle. The size of that organ was very great; it was twice as large as the healthy testicle. In addition to the tumefaction, there was density in those parts, and the man suffered a great deal of pain, which extended as far as the lumbar region.

The antiphlogistic treatment was thoroughly carried out, and nothing that is thought beneficial in these cases of parenchymatous orchitis was neglected, but to no purpose, at least, so far as the preservation of the testicle was concerned. Soft places formed, giving issue to pus when opened, one after the other. When they closed, M. Nélaton thought a small part of the testicle was left, but it was very doubtful.

Tumor of the Testicle, containing Pus.

April, 1854. A man, a wine merchant, thirty-nine years of age, and in appearance quite healthy. He once had gonorrhœa, but never syphilis.

Two years and a half before, for the first time, he felt on the anterior part of the scrotum a movable tumor, that gradually grew larger, and as it did so, was no longer movable, but appeared united to the testicle, and at last the testicle disappeared. This is what the patient said of it.

About two months before his entrance, he went to a surgeon, who thought it a hydrocele, and made a puncture with a trocar. About two teaspoonfuls of blackish, altered blood came out, what the patient called "corrupted blood." In spite of his want of success, the surgeon tried to inject a solution of iodine. One month afterward, he made another opening, by plunging a bistoury into it, and pure red blood came out.

At the time of his entrance into the hospital, on the right side, in the scrotum, a tumor existed as large as a very large chicken-egg, quite regularly rounded, and having everywhere, that is to say, from side to side, and from above to below, a sensation of fluctuation, with here and there a variation in its density. In the tunica vaginalis there was no serous effusion; the spermatic cord was healthy; there was no swelling of the lymphatics; and the man said there was no pain, that he did not suffer at all in the part.

M. Nélaton said the affection could be but one of two things, either an encephaloid cancer, or a variety of hæmatocele, a bloody effusion into the tunica vaginalis. He was quite disposed to think it the latter, and was only prevented from doing so by the following symptom. While handling the scrotum, he felt, in the neighborhood of the spot where the puncture had been made, a crepitation; this crepitation is found when two serous surfaces rub against each other, and he detected, by the ear, a "*bruit de frottement.*" These could not exist with a large effusion into the serous cavity, which would, of necessity, separate the surfaces, and he was forced to conclude the case to be one of tumor in the testicle.

The testicle was removed, under the supposition that the tumor was encephaloid. When the mass was cut open, after its extraction, a creamy pus flowed out from an enormous sac, with thick walls, whose cavity presented just the aspect of one of the ventricles of the heart. When empty, it was exactly like a bladder, with hypertrophied muscular fibres. No remnant of a testicle could be found by the naked eye, but in a portion of the walls, some were found by the assistance of the microscope. M. Nélaton said it was the first time he had ever seen anything of the kind. It was a disease of very ancient date, a small tumor distinct from the testicle being seen at first, and as it enlarged, the testicle disappeared; there was never any sign of inflammation, never any redness, never any pain, never anything to resemble an effusion of liquid; add to all this, the two punctures which had been made, and yet the diagnosis was erroneous.

M. Nélaton said that if he had known previously what it was, it seemed to him that the best thing to do was the excision of the tumor. The man recovered from the operation and went out very well.

Syphilitic Affection of the Testicle.

January, 1852. A man entered for an affection of the right testicle; there was but one in his scrotum, the other could not be found, it had never descended.

When thirteen years of age, he had a fall from a horse, and violently exerted himself. In the course of a few days, a considerable swelling of the testicle took place; it was very painful, and was treated by leeching and antiphlogistics, so that there can be no doubt as to the inflammatory nature of the affection. It is not very rare to meet with such cases, occurring after a violent effort, as, for instance, the raising of a heavy burden. All these symptoms disappeared, and he felt nothing of them afterward.

The man had had several attacks of blennorrhagia, and, eighteen months before, he had had a chancre, followed by bubo. He said he never had any eruption upon the skin. Five or six months before his entrance, his testicle commenced to augment in volume, but the precise point at first affected could not be determined.

When he entered, the scrotum—instead of having a rounded form, as in simple hydrocele—was flat relative to its antero-posterior diameter. In front and below there was a lump, then a depression, followed by another lump, situated in the upper part of the scrotum; they were evidently two projecting cavities, which either communicated with each other, or were separated by a very thin partition, readily yielding to pressure. The posterior portion of the tumor was a hard mass, which the anterior liquid prevented from being very exactly explored.

M. Nélaton thought the affection to be syphilitic—a tertiary symptom—in which both the body of the testicle and the epididymis were attacked, and such cases are most generally accompanied with effusion of liquid in the tunica vaginalis. There was augmentation of volume, accompanied with increase of density in both, but chiefly in the epididymis, which was greatly hypertrophied, having the body of the testicle encased, as it were, in it. On the surface of the body, which could not well be felt in this case, on account of the liquid anterior to it, are often found small granulations; these are small fibrous bodies on the tunica albuginea. In many cases that he had seen, there had been a very notable loss of sensibility, which is a sign it is necessary never to forget; it is not, however, a constant one, without his being able to tell why, and, in this case, there was pain upon pressure.

In making the diagnosis in these cases, the comparison of the two testicles is very useful, for the rule is, that the two are seized, but here there was but one. M. Nélaton has seen a case where the testicle concealed in the abdomen was the first affected; there was a tumor in the abdomen, and until the other testicle was attacked, the diagnosis could not be made.

In regard to the sympathetic hydrocele, it can most generally be cured by a simple puncture without injection; the antisyphilitic treatment is almost always sufficient to prevent its reproduction. The fluid was let out in order to empty the sac, and to make a thorough exploration of the tumor. A great number of granulations were then found upon the anterior face of the body of the testicle, some of them the size of a small pea, with a pedicle to them. It was a syphilitic affection, which had acted chiefly upon the envelop of the epididymis, and the envelop of the body.

In these cases, M. Nélaton said he preferred to give the two medicaments, one after the other; first, the iodide of potassium, in doses of thirty or forty grains, for eight or ten days, persisting with it; at that time, the commencement of an amelioration would be noticed, and, afterward, if none was perceived, he gave the protiodide of mercury, in doses of about one-half of a grain. Under this treatment, the mercury having been added to the iodide of potassium, in the course of but two weeks, a very marked change for the better had taken place, and the man left the hospital, to continue the treatment at home.

February, 1852. A man, with a tumor on the left side of the scrotum, pyriform, and of considerable size. The tension of the skin was moderate, so that it could be easily depressed, in order to reach the testicle. The introduction of the trocar permitted the escape of a perfectly transparent liquid, after which the testicle could be better explored; the surface was very unequal, here and there projecting lumps were felt. When it was sought to determine the epididymis and the body, difficulties were experienced. M. Nélaton had some doubts about it, but he was disposed to believe the body to be anterior and inferior. There was no pain in the tumor upon pressure, the cord was healthy, and there was no trace of inflammatory action upon the integuments; not the slightest adherence.

The antecedents were these: about a year before, he had had an indurated chancre, the treatment of which had been continued but a short time; five months afterward, he had swelling of the testicle, and effusion into the tunica vaginalis; he entered a hospital, when the liquid was let out, and an alteration of the testicle ascertained, the proper treatment was commenced, but at the end of a few days he left; the disease persisted, and he entered the wards of M. Nélaton.

When he came in, as was said before, there was an effusion in the tunica vaginalis, and a tumor very rough, and covered with lumps. In cancer, there is sometimes an effusion, but the tumor is voluminous, soft, and fluctuating, for it is almost always encephaloid. Nothing is more rare than an effusion in a tuberculous affection, and in it the lumps present, also, something peculiar; they are generally accompanied with adherences to the skin, which are thus ascertained; the scrotum is seized in the fingers, and a fold of the skin, corresponding to the lump, sought to be made; a cord is found which goes from the skin to attach itself to the lump. Moreover, in the tuberculous affection there are pains at the level of the lumps, and the vas deferens is often affected. In this case, his diagnosis was syphilitic affection. He said he would cure it, and restore to the testicle its anatomical proportions; in some cases, it can be done in two or three months, in others, in six, eight, or twelve. He ordered a half grain of the protiodide of mercury, to be given every evening, and every morning a gramme, or fifteen grains of the iodide of potassium.

Three weeks afterward, not the smallest quantity of the liquid had been reproduced, and this is one of the peculiarities of the affection, the cure of the effusion by the puncture alone; it being, of course, understood, that the general treatment is carried out, at the same time. There was a remarkable difference in the condition of the testicle; it had been impossible, when he entered, to distinguish what was body, and what epididymis, but at that time it was very easy.

The patient went out, but was told of the necessity of continuing the treatment two or three months longer, which he promised to do.

February, 1853. A man, stoutly built, came in, to be treated for an affection of the left testicle. The account he gave of himself was hard to understand, and rendered the diagnosis of the case a difficult one. He said that he never had had any venereal disease, but four years previously, he had had a discharge, a running from the urethra. According to him, before noticing anything in the scrotum, the glands in the groin were swollen, but upon examination, it was perceived that he had mistaken a hernia for enlarged glands. Eight years before, he recollected to have noticed that his two testicles were not alike; he thought the left to be much smaller and harder than the other, but there was nothing in his history to allow of the supposition that it was Velpeau's variety of syphilitic testicle.

More than three months before his entrance, the testicle commenced to increase in size, and for five weeks it had remained stationary, so that it had reached the size it then possessed in two months.

At the time of his entrance, the testicle was the size of a pigeon's egg, both the body and the epididymis were swollen; in this case the epididymis was in front. The mass was regularly rounded, of *extreme* hardness, and entirely free from adherences to the scrotal envelop; it was necessary to press very hard to make him complain of pain. The spermatic cord was healthy.

The diagnosis of this case was difficult, but some things, at least, could be excluded. It was not a cancer, for almost always in the testicle it is an encephaloid mass, soft and fluctuating; and when, as *very* rarely happens, it is scirrhous, it is not rounded, but covered with lumps, and, moreover, contracts adherences with the teguments, and soon affects the glands. It was not tuberculous, for such cases are recognized by those lumps, that become very prominent, soften and contract adherences with the skin; moreover, the man was the type of strength.

It was thus left to decide between a chronic orchitis and a syphilitic affection. The first was admissible, but it does not generally present itself with such symptoms; it is painful both spontaneously and when pressed, and not so very hard as this was; so that, without entirely excluding chronic orchitis, M. Nélaton was not at all disposed to think it that. In regard to its being syphilitic, every one knows that the most truthful patients will deceive. It is true that but one testicle was affected, and there was no effusion in the tunica vaginalis, which M. Nélaton had always seen in syphilitic cases, but some exceptions can present themselves in pathology; perhaps the tunica vaginalis was obliterated, and, as the disease had existed but three months, it might have been that the second testicle had not as yet had time to be attacked.

The antisyphilitic treatment, at all events, might do good, there could be no objection to trying it, and M. Nélaton begged the class, in doubtful cases, always to incline to medical treatment, and to do something; he added, that it must be continued for three, four months, or even a year.

The patient promised to follow the advice given him, but preferred to do so at home; so that the effect of the treatment remains unknown.

February, 1853. A young man, with two tumors in the scrotum, one in each side; he was sent to the hospital to have them amputated as encephaloid. Each tumor had two parts, one of liquid, the other testicular. From these data alone—two tumors, and both partly liquid—M. Nélaton declared, without the least hesitation, that the affection was syphilitic.

The patient said that, eight months before, he commenced to suffer, according to his own statement, in the cord, and, upon examination, he ascertained that the testicle was enlarged, which enlargement showed itself at first in the superior part. Six months after that, consequently two before his entrance, the left testicle was attacked. He said he used to experience pains, as from the prick of a needle; what surgeons call lancinating, and others that came on in the night. When he came in, however, he had none, either nocturnal or upon pressure.

These things being ascertained, the scrotum was examined. On the right side, toward the upper portion, was a fluctuating projection, and the skin was there very thin; the left side had the same form. Punctures were made, that allowed the escape of a liquid, containing cholesterine in suspension, and enabled the parts to be well examined.

On each side was a mass, greater, however, on the right side (where, without exaggeration, it was as large as the fist) than on the left, formed of two parts, the body of the testicle and the epididymis. Inferiorly, the distinction between the body and the epididymis could not be made out; on the side the latter covered the former, just as the cup does the nut of an acorn, except that it was at the side, and not at the top. M. Nélaton said that the descriptions of syphilitic affections of the testicle, met with in books, do not correspond with what he describes as such himself. A few days before, he had read the article of M. Velpeau, in the Dictionary in thirty volumes; this proves to him that there are two forms of the disease, one of which, that described by M. Velpeau, is very rare, for, in his immense practice, M. Velpeau had only seen it twenty times, and he himself had met with it but twice.

This patient said he never had had any clap, nor anything like a chancre; but he said he had nocturnal pains in his tibias, and on one of them was an exostosis, which was painful when pressed upon, and this is the character of syphilitic exostosis. Again, there was pain at the level of the knee, and on the spine of the scapula, and on the two clavicles were exostoses, also accompanied with pain.

In general, the nocturnal pains of syphilitic patients are only pains *of the bed*, and if the night be passed in labor, they will be troubled when in bed in the daytime. These pains are also augmented by radiated heat, as cooks know very well.

This affection of the testicle is almost always composed of these two parts, of the effusion of liquid (and, what is singular, the hydrocele has very rarely a regular form), and of the testicle enveloped in the epididymis.

There are no pains. Sir Astley Cooper, speaking of this, says, you are astonished by the rudeness with which you can handle it. This, however, is not constant; and M. Nélaton said that he could only explain the difference by the supposition, in certain cases, of the existence of a quantity of healthy structure, retaining its normal sensibility. This disease shows itself, almost always, in both testicles, but, of course, at the commencement, only one may be attacked.

Of these cases, a certain number of those that come under medical treatment, under the influence of the iodide of potassium, *get well;* by which is meant, that the testicle resumes its natural form and volume. This cure is not accomplished in one month; four, five, eight months are necessary, at the end of which time the testicle possesses again its physical, and, moreover, its physiological properties. As to the hydrocele, it remains, and can be cured, almost always, by the simple evacuation of the liquid; in at least one-half of the cases, this suffices. This affection can be considered as a symptom *of transition* between the secondary symptoms and the tertiary, and, therefore, M. Nélaton prefers to make use, at the same time, of the medicaments proper to both; with the iodide of potassium he gives, also, the protiodide of mercury.

The simple puncture, in this case, was not sufficient for the cure of the hydrocele, as it generally is when the patient is being treated constitutionally, and the injection of iodine had to be resorted to.

At the end of three months, there was a great reduction of volume, to the extent of two-thirds of the mass; that is to say, that at that time the testicle had but one-third the size it possessed when he entered; and, moreover, there was a great change in the small lumps felt on the body of the testicle. M. Nélaton said it was probable that the progress of the cure would be slower, for what remained. The mass had then the form of the testicle, but hard points were felt here and there.

After remaining five months in the hospital, taking all that time the iodide of potassium and the protiodide of mercury, the patient went out, promising to continue the treatment. In May, 1854, he returned again, better than when he went out, but with a relapse in his right testicle. His means had not permitted him to continue the treatment for one year, as he had been advised to do. His left testicle was normal, but the right was about twice as large as it should be. Leaving Paris a few days after his return to the hospital, I cannot say what the ultimate result was in this case.

February, 1854. A young man entered for an affection of the testicle. On the left side of the scrotum was found an augmentation of volume; it came from several causes united; in the tunica vaginalis there was an effusion—it was very easy to see that—to about the depth of the third of an inch around the body of the testicle; and, more deeply, a mass was found constituted by this body and the epididymis. The epididymis was much increased in size, as was particularly evident below, and its consistence was considerable; the mass it formed was *immediately* upon the body of the testicle; there was not a small mesentery, as is sometimes found. The body itself was about the normal size; yet, by examining it with attention, small granulations were felt—small hemispheres, projecting on the surface of the organ. There was a total, complete absence of adhesion with the integuments.

The diagnosis in this case was one of some difficulty, and it was precisely in the patient's answers to questions put to him to make the case more clear, that the difficulty came.

It was certainly one of three affections; an epididymitis passed to a chronic condition, a tuberculous affection, or a syphilitic.

As to the first, he never had had any clap, the usual cause of epididymitis; he had never received any blow upon the testicle, nor had it been rubbed in any way; if it were an epididymitis, it had come spontaneously. When asked, to see if the history of the case would correspond to one of epididymitis, he said he had not been forced to go to bed; that his scrotum had not felt hot; in short, there did not appear to have been the symptoms usually observed in inflammation of that part.

As to its being tubercular, there was no suspicion of tuberculous affection in the man's appearance. He said the tumor had developed itself rapidly, and then had remained as it then was; this is not like a tuberculous affection of the parts. In them, the patient finds a small nucleus, which, in the course of time, of two or three months, causes an inflammation of the parts around; the cellular tissue loses its suppleness, and adhesions form with the skin. Here there was nothing of the kind; so that it was not tubercular.

When questioned as to syphilis, the patient's answers were very direct; he not only never had any venereal disease, but never had had any sexual connection. The day after he entered, he said that, when very young, when but twelve or thirteen years of age, he had something the matter with his penis, just at the orifice of the meatus, that crusts formed there, that the place was very sore, and that his linen was spotted by it. M. Nélaton said he would wait to see if he would not go further, for on the day he came in he would confess to nothing. There was effusion in the tunica vaginalis, a symptom never absent, or very rarely, in syphilitic testicle; while in tuberculous disease it is rather the exception than the rule; this effusion, as is generally the case, was not very considerable. There were small granulations, quite firm, on the surface of the body of the testicle, and these so often exist that M. Ricord has thought the principal seat of the affection to be there, in the tunica albuginea. The epididymis, in these cases, becomes larger; it not only becomes longer, but it becomes also much wider, and it forms *a kind of hull*, in which the body of the testicle is placed. In the present instance, a great part of the body was thus covered up by it.

M. Nélaton said he had a great tendency to believe the examination of the patient's *present condition*, rather than the *commemoratives;* to believe *himself* rather than *the patient.* At all events, he concluded to employ antisyphilitics in his treatment. He made a puncture into the hydrocele, which most probably would not return, when the constitution was modified by the treatment, if it were from syphilitic disease; and in other cases it would.

After the patient had been two weeks in the hospital, the effect of the treatment already showing the correctness of the diagnosis, he one day remembered that the small sore on his privates, he had had when twelve or thirteen years of age, had made its appearance after a trial of his force with a little girl who had something there also.

Tuberculous Affection of the Testicle.

February, 1852. A young man, of pretty good constitution, entered the wards. Two years before, while in the military service, he had been ill, with all the symptoms of a severe attack of pleurisy, from which he recovered. One year afterward, he had the first symptoms of the disease for which he came into the hospital. About twelve months before, toward the inferior angle of the epididymis of the left side he found a small tumor, hard, indolent, and about the size of a hazel-nut. This tumor by degrees became painful, softer, and fluctuating, and a puncture being made, pus came out. Shortly after that, another tumor made its appearance in the superior part of the epididymis. The tumor in which the puncture was made continued to give issue to pus until the time of his entrance. In the body of the testicle nothing had ever been observed. Two months before, the right testicle presented similar symptoms, quite large lumps occupying the whole of that portion of the testicular mass constituted by the epididymis.

When he came in, at the part corresponding to where the first tumor had formed was a depression in the skin, in which was an opening, and in the subcutaneous tissue was felt a cicatricial cord, very easy to perceive, passing from the integuments to the epididymis. A tubercle had been developed there, had softened, an inflammatory action had taken place, the integuments had formed adhesions, and a fistula had resulted. In other parts, the disease had not advanced so far; in some, the tubercles were in the condition of softening; in others, they were still crude. In this case, then, the three stages of the tuberculous affection of the testicle were seen, crudeness, softening, and fistula.

Both the organs were affected, *as is the rule;* the disease can exist for some time in one alone, but the other is almost always attacked afterward.

It is not rare to find the vas deferens injected, so to speak, with tuberculous matter. In this case, there was a slight difference in the size of the two, that of the right testicle being somewhat the larger; but the difference was not sufficient to permit a decisive opinion. The seminal vesicles have been seen, filled with tuberculous matter, but the diagnosis of this condition is not easy. In such cases there are pains in urination, here, there was nothing of the kind; a muco-purulent oozing from the meatus urinarius with the last drops of the urine is sometimes seen; but here there was none; it is said, moreover, that from the position of their ducts there is pain in the prostate on pressure, which also was wanting here. In the present instance, the disease was limited to the two testicles, and consisted in the development of large indurated masses in the epididymis. In other cases, a myriad of small bodies in the body of the testicle is seen, without the epididymis being particularly affected. Supposing a case, where there would be large masses in the epididymis, and miliary granulations in the body, the diagnosis from syphilitic affection would be very difficult.

There was still persistence of the genital functions in this patient; but if the disease continued, they would be abolished.

This young man also had in the right side, in the iliac fossa, in the lumbar region, a tumor, quite regularly globular, that extended as far forward as the median line. Attentive examination showed it to be constituted by a liquid contained in a sac, that was quite forcibly distended. It is in this place that abscesses symptomatic of vertebral disease generally show themselves. The patient said he used to have pains in the loins, and when asked to point out the spot, he indicated the lower portion of that region, and, above all, the sacrum. An osseous projection in the continuity of the sacrum was found there, at about the level of the junction of the first two pieces with the three following. With that exception, there was no deformity of the spine, nor was there pain anywhere.

It was probable that this affection of the sacrum had existed a long time, but the patient said it was but three months since he had first noticed it, and, even in admitting what he said to be correct, and that it was of recent origin, it would not give the explanation of the existence of this tumor. Abscesses, having their origin in disease of the sacrum, invariably tend to escape by the sub-pelvian orifices. M. Nélaton thought it an abscess symptomatic of an affection of the vertebræ, and of an affection that had not determined any deformity, for every day these cases of disease of the vertebræ are seen, without any deformity.

This patient remained but a few days in the wards; so far as the affection of the testicle is concerned, there was little to be done for him, beyond attention to his general constitution. With regard to the treatment of the sympathetic abscess, the opinions of M. Nélaton will be found elsewhere.[1]

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[1] See Chapter IX. p. 261.

November, 1852. A man, twenty years of age, entered for an affection of his right testicle. The whole mass formed by it presented a considerable volume. At the anterior part was an ovoid body, resembling the body of the testicle, which was placed behind what appeared to be a liquid; both the touch and the light showed this to be the case. This serum in the tunica vaginalis was at once evacuated, in order to permit of a more exact examination of the rest of the mass.

The epididymis was much enlarged; toward the inferior portion was a swelling quite hard to the touch, and toward the superior portion was another, supple, soft, and fluctuating. When a swelling is seen in the epididymis, the first question should be, if there be a running from the urethra. In this case, there was none. The man said he had received no contusion there, but that two days before the swelling showed itself, he had made a violent effort in lifting. Some celebrated surgeons have doubts as to whether this could be a cause of inflammation of the testicle, but cases are met with in which it is evidently so. When, however, such is the case, the patient perceives it immediately, at the moment he makes the effort.

Again, in this case, was the affection a simple epididymitis, or was it tuberculous? The young man had a feeble appearance, was very subject to colds in the head, and almost always had a cough; for some time past he had been getting thinner, so that his friends no longer recognized him. At the commencement of the affection he suffered but little pain, but it was gradually and continually increasing.

An opening was made into the superior swelling, and some pus issued, in which was a large quantity of flakes. The next day the orifice had closed, and a new collection of matter was formed. M. Nélaton said he did not believe this to be a simple abscess from an ordinary inflammation, but one having its origin in a tuberculous affection of the epididymis, at least, what is commonly called *tuberculous*. He said the opinion of M. Velpeau, emitted *en passant*, he believed in more and more every day; every day he saw the truth of it, that, in very many cases, the affection described by authors as a *tuberculous* affection of the epididymis, is not so in reality; it is an inflammation of the epididymis, but of a peculiar march, and in it tumors, which have a great resemblance to tubercular tumors, are seen. He thought that he had to deal with one of these cases, in the young man at present in question.

In order to close the sac of the purulent cavity, an injection of the tincture of iodine, mixed with water, with the addition of some iodide of potassium, was made use of. As a constitutional treatment, the preparations of iron, of iodine, and cod-liver oil, were administered.

By these means, the sac of the abscess closed, and the boy's condition was very much improved, but he left the wards before the case had fairly terminated.

December, 1852. There were three cases in the wards, of affections of the testicle.

The first was a man, who said that while holding his child in his arm, on the twenty-fifth of July, of the same year, the child gave him a kick, striking the testicle. It gave him a great deal of pain, but he was able to work for the rest of the day, and for the next one also; the third day he could not work, on account of the pain and swelling. After eight days had elapsed, he went to the Hôtel-Dieu; cataplasms, &c., were made use of, and, after remaining two weeks, he went out better, but with the testicle larger than the other. Thus things went on, better and worse, until twenty days before his entrance into M. Nélaton's wards, when a point appeared upon the scrotum, which opened, and matter came out. He said that, fifteen days before, his right testicle became larger than it normally was.

The left testicle was larger than it should have been, principally on account of the increase in size of the epididymis; the body of the testicle was of the natural size and consistence. On the epididymis were lumps, some hard, and others more soft, and one fistulous opening, from which, during the first few days of his stay in the hospital, pus could be made to flow.

The other testicle, the right, was augmented in volume by two things, by an effusion of liquid in the tunica vaginalis, and behind that, by the epididymis, four times its natural size.

M. Nélaton said his diagnosis in this case required some explanations. Tumors form in the testicle, which present very much the same symptoms; they are either tuberculous or simply inflammatory. The tubercles can be in a mass in the epididymis, and also in small gray granulations in the body of the testicle. On the present occasion, he did not occupy himself with these granulations, but with the masses in the epididymis. These large lumps remain there for some time, and the surgeon determines the existence of indurated masses, completely indolent; when they are pressed very hard, the patient suffers, but only as he does in the healthy testicle. After a period of indolence, a process of softening commences, beginning generally on the surface, and going toward the centre; in the neighborhood there is inflammation, adhesions form and ulcerations, that tend to perpetuate themselves as fistulas; and a cord, leading from the cutaneous orifice to the internal parts, can always be found, showing the departing point of the inflammation, as can easily be understood. There are, then, three periods—of indolence, of acute inflammation, and of fistulous ulceration. Now, when a case is seen in this third period, how can it be discovered whether it be tuberculous or simply inflammatory? Some such cases are insoluble, for it is impossible to obtain the information necessary to make a differential diagnosis. At first the symptoms are different, but arrived at a certain period, a difference in the symptoms cannot be detected. In this case, it is true, both testicles were attacked, and one quite recently, but from the commencement it had been very painful, with none of the indolence of the tuberculous affection. The tuberculous affections of the testicles have an extreme tendency to develop themselves in the two organs. *The tuberculous affection really exists, but it is far more rare than is thought.*

The treatment of cases like this, that is, which are simply inflammatory, is simple; a case in which it is necessary to think of castration, is excessively rare. There is another operation, *resection*, which has been largely discussed in the Academy. M. Nélaton said that, to condemn that operation, it was sufficient to be well acquainted with the march of these diseases; spontaneous cure generally results, with careful attention.

The *second case* was a young man, who said that, several months before, he had been struck by an iron instrument on the scrotum.

On the right side, the testicle was about double its normal size, and both the body of the testicle and the epididymis were affected. There were several small holes in the skin, fistulous orifices, where there had been ulceration and evacuation of tubercle. Large masses could be felt in the epididymis, and miliary granulations in the body.

On the left side, the disease was just commencing; there were tubercles in the epididymis, in the first stage.

The *third case* was a deceptive one. The man had a gonorrhœa, and thirty days before his entrance, and shortly after the discharge commenced, the epididymis of the left testicle became very large, and excessively painful to the touch.

In these cases of epididymitis after an urethral affection, a propagation of the inflammation along the mucous membrane is generally believed to be the cause, but there is another opinion, which has been sustained principally by M. Sappey. He has remarked the network of lymphatics, that follows all these parts, and he supposes the affection to be an angeioleucitis of the lymphatics of the vas deferens. This accords very well with the excessive rapidity of the march of the affection, and with some other symptoms, as, for instance, the effusion of serum; as in inflammation of the lymphatics of the arm, there is œdema of the hand, so here, in these cases, there is effusion in the terminal portion, in the sac of the tunica vaginalis.

In this case, the boy said that, fifteen minutes after the sensation of pain, he saw the testicle *grow*.

The termination of the first of these three cases was very singular, and the condition of the testicles, as shown at the autopsy, did not accord with M. Nélaton's diagnosis. After remaining in the hospital for about eight weeks, he was seized with symptoms of extreme prostration; there was no diarrhœa, no difficulty of breathing, and the pulse was small and slow. While in this condition, he was taken with extreme agitation, lasting for three or four hours. The next night he passed quite well, but the following day the same thing occurred; he was greatly agitated and delirious. The supposition that this might be meningitis, accorded very little with the intermittence of the symptoms, for though there may be diminution, there is never complete cessation. As heat and perspiration followed these attacks, he was treated as if it were pernicious intermittent, and quinine was given. In spite of all that was done, he died on the fifth day.

M. Nélaton was unable to be present at the autopsy, which is to be regretted, for the anatomist who wishes, readily finds traces of inflammation of the membranes of the brain, or too much fluid in the ventricles, as was the case in the present instance. Some of those present thought they found such traces, and others did not; and there was the same variance of opinion in regard to the spleen, some thinking it abnormally large, and others not so.

The most diseased testicle was kept for M. Nélaton's examination. There was something like a mushroom projecting from the mass, and when the testicle was cut open, a tuberculous deposit was found, opaque in the centre, and more transparent at the circumference. In the epididymis the tubercular deposits were very numerous.

March, 1853. A man, a common laborer. At the most prominent part of his left buttock was an opening, presenting all the characters of having resulted from some inflammatory action. The skin around was detached from the more deeply seated parts, as was seen by its brown color, and a probe introduced into the opening, entered several fistulous passages, passing toward the tuberosity of the ischium. When asked if any urine came out of the opening, the patient said no, but that he always had some difficulty in urinating. A catheter was easily passed through the urethra, and there was no calculus in the bladder.

In touching the testicle, a swelling, a small tumor, was felt at a point corresponding to the globus minor of the epididymis. There was also another tumor, long and very narrow, elongated in the direction of the cord, situated higher up in the scrotum. This tumor was fluctuating, and in the middle of it a small, hard cord was felt, which a very careful examination showed to be connected to the vas deferens.

When the prostate was touched through the rectum, it was found to be very much deformed; it was filled with hard lumps.

There were then in this patient two affections, the fistula, in the left buttock, and the disease of the genital organs. In regard to the latter, M. Nélaton said he had no doubt it was tuberculous; the affection of the prostate is a condition quite often observed, and in it he thought the explanation of the difficulty of making water was to be found. The fluctuating tumor high up in the

A few days after the operation, M. Nélaton made some remarks about this case, in reply to several questions addressed to him.

One was, as to whether an engorgement of the lumbar ganglions, supposing it to exist, could always be detected. To this his answer was decidedly in the negative; a *small* lymphatic most certainly could not, for it must be felt through the walls of the abdomen, the epiploon, &c. In practice, however, when the walls are supple, and there are no stercoral matters in the intestine, they generally can be detected. The counter-proof, with the other side, must always be made, and care must be exercised, so as not to mistake feces in the colon for ganglions; for the avoidance of this mistake a slight purgative suffices. It is not *always* possible, it is true; but generally, with a little attention, it can be done.

Another question was, whether finding the ganglions engorged was a counter-indication to the operation? The answer was, certainly; whenever the engorgement did not exist everywhere, on one side as much as the other. If the operation be performed when the ganglions are engorged, in two months they will be as large as the two fists, even where they had been scarcely felt before.

A third question was, whether Benign Fungus of the testicle could be confounded with this affection? M. Nélaton said that several affections were described under this name; that it was not always the same affection; but that in no case was it possible for any one properly acquainted with his profession to make such a mistake. He would, however, as the question had been put, make a few remarks on this subject. The first variety of Benign Fungus is seen when the testicle inflames; as in some cases, for instance, occurring during gonorrhœa, the inflammation being not only in the epididymis, but in the glandular mass itself. This swells, and the tumefaction may become so great that the tunica albuginea is ruptured, and the glandular substance makes a hernia. It happens, sometimes, in these cases, that almost the whole mass becomes exterior to the tunic. When in this condition, the skin can inflame and open, and an enormous mushroom project; this mass is very vascular, and becomes strangulated, so that the blood cannot return with facility. All this suppurating and bleeding can easily cause a belief in its malignancy; but the history of the affection, the intensity of the inflammatory sympthe tuberculous diathesis, without there being tubercles there or elsewhere. As to the operation proposed by M. Malgaigne, he showed it to have been practised by Sir Astley Cooper, and contested its necessity by the fact that patients most generally recover without an operation, and that the partial operation is no longer applicable when the disease has reached its height; the operation of Malgaigne must be most generally useless, and sometimes injurious, and in the rare cases in which it could be applied, the usual treatment of fistulas and vegetating abscesses is sufficient.

M. Velpeau said that it was evidently necessary to operate in cases, where the testicle was the seat of many agglomerated tubercles, in a state of suppuration, with fistulas; in other words, when there was great disorganization; but then there was but one operation possible, which is castration. In other cases in which there is but one tubercle, or a group of two or three small tubercles only, the rest of the testicle remaining healthy, in them the cure takes place in the course of time, and with the usual surgical attention.

The operation of M. Malgaigne, therefore, is useless when the fistulas are limited, indolent, and suppurating very little; it is insufficient in very serious cases; and, moreover, it presents difficulties, and also dangers, for it destroys and removes the partitions of new formation, which inclose that portion of the testicle that has remained healthy, and which prevent the consecutive formation of a hernia of the seminiferous vessels.

Tubercle is the name given, in pathological anatomy, to a morbid production of a yellowish-white color, generally rounded; that in the crude state has a consistence analogous to that of concrete albumen, but harder; that becomes afterward soft, friable, and by degrees acquires a consistence and an appearance analogous to those of pus.

In these morbid productions, a characteristic anatomical element is found, called the *corpuscle of tubercle.* This anatomical element is characterized by its polyhedric, angular form, its diameters equal in all directions, or a little longer than broad, rarely exceeding 0.007 millimetre, or 0.008 millimetre, or about $\frac{1}{4000}$ inch. This small volume, this polyhedric form, together with edges slightly dentated, distinguish, of themselves alone, this element from every other. Besides, the corpuscles are rendered pale by acetic acid, without being dissolved by it, and without presenting a nucleus or nucleolus any more after its action than before. Their mass is sprinkled with small, dark granulations, all of about equal volume, and equally affected by the acetic acid, except those that are of a fatty nature, sometimes found amongst them. This element is one of those that vary the least from one part of the economy to another.

Tuberculous tissue is a *product* of the economy, not a *constituent;* it is not vascular, nor sensitive. It is composed of the *corpuscles* deposited through the mass in no particular order; and of finely granular, *amorphous matter*, which in the tubercle of certain regions, as of the kidney, can compose the greater portion of the mass.

This amorphous matter is quite solid, quite firm, in the crude tubercle, to which it gives its consistence; it is it that, in passing insensibly, in consequence of the phenomena of nutrition, to the half liquid or liquid condition, determines the *softening of the tubercle.* In that condition, the characteristic elements, the corpuscles are found suspended in the liquid thus formed; but they are only mixed with pus, when the tubercle communicates with the cavity of an organ, and exhibits around it symptoms of inflammation, acute or chronic.

The existence of what is called infiltered tubercle, has never been demonstrated. Tubercle can make its appearance in bones, but it is not so common as has been supposed; very often a mass of concrete pus has been taken for a tubercle; or the pus, filling the areola of the spongy tissue of the bones, the tubercle is said to be infiltered.

It is important to notice, also, that tubercle, like cancer, substitutes itself for the elements of the organs that it invades. It never fills up, or distends, glandular culs-de-sac, excreting ducts, testicular tubes, etc. There, as everywhere, it destroys these parts, and replaces them.

It is chiefly in individuals of scrofulous constitution that tubercle develops itself at the same time in a great number of organs.

Cancerous Affection of the Testicle.

February, 1853. A young man, of sickly appearance, and with a yellow tinge in the skin. Seven years before, he had a chancre on his penis, which was cauterized, and since then he had had no manifestation of venereal disease. Nine months before, he had pains in the testicle, and at the same time he observed that it was increasing in size.

At the time he entered, the testicle was as large as the fist, broader above than below, and hard and lumpy; below that was a part more regularly ovoid, soft, and evidently fluctuating. The mass was slightly painful to the touch, and it seemed as if the pain he experienced was that characteristic of the testicle; he only felt it when the upper part was pressed.

The spermatic cord was larger than on the other side, and the vas deferens was normal. The increase in size of the cord, on the affected side, was owing to the increase in size of the envelops; for it should be known that, when the testicle increases, the cord often does so in order to support such a weight.

The tumor was not transparent, showing it could not be a hydrocele, which, moreover, would not present the hard lumps. As to the supposition of its being a hydrocele, with hard and thickened walls, that could not be, for such cases require five, six, and seven years in their formation. It could not be an hæmatocele, for they almost always arise from a blow, or other violence, and there was nothing of the kind here; moreover, the well-marked distinction between the upper and lower parts of the tumor would not be found.

In addition to arriving at the diagnosis of this affection as encephaloid, by exclusion, there was also direct proof of it, namely, the existence, along the vertebral column, of hard lumps, showing that the lumbar ganglions were degenerated, and there is never anything of this in those other affections. There is here a cause of error, from the presence of fecal matters in the colon, but the action of a purgative decides the question at once. When inquiries were made as to the state of his respiratory organs, the patient said he spat blood, and, besides, had pains in the left side of the chest. M. Nélaton said then, that it must be concluded that this was a case of cancer, and, of course, *generalized.* He thought it better, however, to do something; the man was young, and very intelligent, and discouragement as to his condition would only hasten the fatal termination of his case.

In addition to recommending a general tonic treatment, he therefore made a puncture into the tumor with a trocar, not to explore it, but to have the appearance of doing something locally, in order to act upon the *morale* of the patient.

The introduction of the instrument confirmed the diagnosis in the case. The poor fellow left the hospital at the end of three days, and never returned.

December, 1853. A man, thirty-six years of age, who had been a water-carrier, and able to carry his buckets all day without much fatigue; since then he had been a *charbonnier.* These occupations show him to have been very strong. He never had had any syphilis, or any inflammation in the scrotum during an attack of gonorrhœa. The general health was excellent; there were no signs of any affection in the thorax.

Three months before, he observed the left testicle to be larger than it should be, being about twice the size of the other. When asked if the size had been increased by a small tumor, added as it were to the testicle, his answer was no, that it was the organ itself that was enlarged. For about a month, he remained very well satisfied with having found this out; but at the end of that time, consequently just two months before entering the hospital, he commenced to feel pains in the cord, and these becoming aggravated, he was at last uneasy about himself, and came there for advice.

At this time, the left testicle was very much larger than the other, being four inches and a half long and two wide, and quite regular in form, though, when the light was made to fall properly upon it, some portions were seen to be more elevated than others. The mass was quite soft, and semi-fluctuating, perhaps it might be called fluctuating; but the fluctuation was not so evident as it sometimes is in these cases; it existed in the inferior three-fourths of the tumor. The rays of light did not traverse the mass. The cord was larger than natural, but there were no irregularities in it. The patient had pains in the cord, and in the loins, but never in the testicle itself.

In the first place, M. Nélaton said he desired to call attention to one symptom, *the weight* of the mass. Great weight of the tumor is found in authors as one of the symptoms of cancerous affection of the testicle; but, long ago, he had his doubts about it, and the following is the result of his examinations: A large glass, *full* of water, was in readiness, and the testicle, after its ablation, was put into it, the displaced water being received in a basin in which the glass stood. This displaced water, of course equal in volume to the testicle, was then weighed, and after it the testicle itself. This was done on many different occasions, and it showed that if the cancerous mass weighs two hundred and fifty grammes, the water will weigh two hundred and forty-five. Now, it is most certainly impossible for any hand to detect so small a difference as this; and, moreover, it must be recollected that the contents of a hydrocele are serum, which is heavier than water; again, there is the testicle, and, in addition to the rest, are the envelops of the parts, the same in both cases, and tending to equalize still more the specific gravity. Greater weight cannot then be considered a symptom of cancerous affection of the testicle. The existence of a hæmatocele was the only thing that could deceive in this case, and of that there were no explanatory antecedents, and although there is such a thing as true spontaneous hydrocele, yet its march is exclusively slow, and here the size was very great at the expiration of but three months. As, however, the most experienced surgeons have been deceived, and as, if a hæmatocele, a puncture will suffice, if followed by an injection, to cure the patient, M. Nélaton first, as should always be done, introduced a trocar. No fluid coming out, he proceeded to the amputation of the mass.

The incision was made on the external lateral portion of the scrotum, somewhat posterior, in order to permit of the easy escape of the pus. The cord was cut, as Boyer practised it, the parts being divided successively. When the artery was cut, it was tied, and after it the vas deferens was divided.

This tumor weighed a hundred and forty-four grammes (about five ounces and two scruples), and the water it displaced, one hundred and thirty-five.

case here. Fourthly, "the entire absence of transparency." Fifthly, "the sensation of the testis being squeezed, with less compression than when the disease is hydrocele." M. Nélaton said, in the French translation he could not tell whether that meant by the hand or by the developed tumor. He had with him also an English edition, in order to ask if the passage were more clear in the original, but it does not appear so. Sixthly, "the more dilated state of the vessels of the cord and scrotum." In this case, this did not exist. And seventhly, "the testis in hydrocele can be felt at the lower and back part of the swelling, although obscurely, which is not the case when the disease is of the encysted nature."

The determination of this tumor, to be hydatid, was very satisfactory, for, as Sir Astley Cooper says, it is always a local affection, and there is never a return. The edges of the wound were brought together, and kept there with serres-fines, and cold water dressing was made use of. The man got well without any accident.

This affection is so rare, that M. Cruveilhier has seen but one case.

Tumor of the Testicle, from Inflammation of its Veins.

January, 1853. A young man entered with a rare affection of the testicle, concerning which all he was able to tell was, that two months before, he made a violent effort in lifting, and he considered that the cause of his disease. As, however, he said that the same day he suffered but moderately, and that eight days elapsed before the symptoms for which he came in commenced, M. Nélaton refused to acknowledge the violent effect as the cause.

It was necessary, on account of the tenderness, to examine the parts with the greatest care. The whole purse of the left side was too large; it was about four times larger than the right. Underneath the integuments was a mass, evidently formed by the testicle, ovoid, and when it was sought to analyze it, as must always be done in the scrotum, where there are so many different parts, it was found to be one and the same mass; it was exceedingly difficult to tell what was epididymis, and what was the body of the testicle. When the groove, which separates the two, was sought for, it could not be found; externally and inferiorly, it had entirely disappeared; above, it seemed a little better marked, for there was a small mass there that resembled the epididymis, rather than a testicular swelling. This mass was immediately under the integuments; there was no intervening liquid; it was homogeneous, and not fluctuating.

When the spermatic cord was seized, and the filaments composing it were passed, one after the other, between the fingers, it seemed as if the vas deferens could be distinguished, not so large as on the right side, but it was not positively certain. Books on surgery say that when the vas deferens is pressed upon, a peculiar pain is experienced, but, generally, M. Nélaton has found that when the pressure is limited to it, the pain is very slight, and is an obtuse pain. In the cord was found a mass composed of several cords, superposed one on the other, and hard, which were thought to be inflamed veins. This peculiar hardness could be felt in the inguinal canal, and in the iliac region, in the spermatic vein.

The affection was one of the body of the testicle and the epididymis, and of the veins of the testicle. M. Nélaton thought it very probable that the patient had had varicocele for a long time, and that this varicocele had become inflamed. This inflammation of a varicocele is not very rare, but he had never, however, witnessed the symptoms seen in this case; he had only seen œdema of the scrotum.

He had doubts as to what would happen in this case, but inclined to believe that the termination would be unfavorable to the testicle. He believed fungus of the testicle would result, and said he would not be surprised if the doubtful lump, felt in the superior part of the mass, would turn out to indicate a rupture already formed in the tunica albuginea.

The boy, finding nothing gained by the treatment, went out, after remaining but a few days.

Varicocele.

January, 1852. A young man entered the wards on account of a varicocele, which M. Nélaton said he would treat by a method not, as yet, commonly practised. There are several varieties of varicocele, which fact should never be forgotten in the treatment; some are enormous, and not at all troublesome, and often others, that are very small, are exceedingly painful. In the present instance, the varicocele was but moderately developed, and, nevertheless, very painful. In similar cases, occurring in wealthy individuals, who can nurse themselves, cold applications, applications of alcohol, with tannin in solution, and the use of a well-made suspensory bandage, to support the parts, are sometimes sufficient to make them very comfortable. Here, however, such treatment was not practicable.

There is an operation of Sir Astley Cooper, which consists in the excision of a large portion of the purse; the operation is a dangerous one, but the idea could be made use of. In order to avoid the operation, and, at the same time, to obtain the benefits resulting from it, the testicle and the veins were pushed far up, and all the portions of the purse left below was introduced into a tube of caoutchouc.

The result of this treatment was entirely satisfactory, and, after remaining a few days, the young man left the hospital, wearing the elastic tube, and no longer feeling any inconvenience from the varicocele.

The same treatment was equally satisfactory, in a similar case, that was in the wards shortly after.

March, 1852. A young man, who desired to be cured of a varicocele, in order to be able to enter a cavalry regiment. This dilatation of the veins of the scrotum is seen to appear at the age of fourteen, and to disappear in old age; the time of life at which this disappearance takes place, as a general rule, is between forty-five and fifty. There are two kinds, one painful, and the other not; but the pain does not depend upon the volume of the tumor.

It is only within twenty-five years that much attention has been paid to the treatment of this affection; Breschet was the first who made it fashionable. Many different proceedings have been proposed for its cure; among the most generally practised, are those of Ricord, of Velpeau, and of M. Vidal. For himself, M. Nélaton said he preferred the cauterization of the veins by Vienna paste, and for its application has invented a small instrument. He has operated thus very often, and always with much success. The objections to the proceeding are that it is long, and leaves traces of the operation on the scrotum.

The paste was applied by means of his instrument, and in six days the mortified parts were eliminated. A deep groove was left, which covered itself with pyogenic granulations, and in nine days, fifteen after the application of the treatment, the wound was closed. The patient immediately left the hospital; his varicocele was then cured.

February, 1854. A young man, twenty-three years of age, entered the hospital. Three years before, he said he had pains in the inguinal region, on the left side, and he saw a tumor there; shortly after, he noticed that the whole purse of that side was increased in volume. In 1852, he put himself in the hands of a surgeon, who, recognizing a varicocele, applied the forceps of Breschet. It would seem as if this had not been found sufficient, for ligatures were also applied, simultaneously, to the veins. The threads fell in eighteen days, and the forceps in twenty-eight.

When he entered, there was a considerable augmentation of volume on the left side of the scrotum—where varicocele generally occurs—manifestly owing to the veins; they could be seen and felt, and found to disappear on the slightest pressure. The patient said he was worse in summer than in winter; in short, there were all the symptoms of varicocele.

The patient said he felt, from time to time, very sharp pains low down in the abdomen, and, at the same time, something would come out there which he could push in, *in a lump*. This seemed like hernia, and he was desired to make some efforts; but it could not be forced out. The ring on that side—the left—was larger than on the other, but there were still doubts as to what this might be, until one day, after he had walked a long time, a large tumor was found there, that had a pedicle, entering the abdomen, so that it was, without any doubt, a hernia.

What it was necessary to do in this case, M. Nélaton said was a difficult question to answer. In regard to the varicocele, he is of opinion that they should never be operated upon, but in cases of urgency. The considerations of urgency do not come from the volume, for some in whom it is enormous, say they are not inconvenienced; others, with a very small varicocele, complain very much. In his opinion, they should only be operated upon when there are symptoms of pain, a feeling of weight in the part, not to be corrected by suitable applications. It is necessary, in order that he decide to perform an operation, that the pain be so considerable as to interfere much with the patient's business.

It is said by some authors that varicocele produces atrophy of the testicle, but M. Nélaton is not persuaded of this. He has examined a great number of cases; the testicle corresponding with the affected side is often seen to be a little smaller than the other, but that is not atrophy. He does not know that it has ever been shown that the diminution took place after the appearance of the varicocele, and he believes the difference in size, when it does exist, existed before. He did not *know* this, he said, but it was what he *believed*. Even admitting that the testicle did become smaller after the dilatation of the veins, does that show that it is atrophied? If the testicle be smaller, is it less apt to perform its functions? All the patients he has asked, have told him they perceived no difference in their genital functions. It must be remembered, that a great difference of volume is *never* seen; it is at all times but very slight.

When an article on varicocele is read in a book, it all seems to be composed of falsehoods prepared in the cabinet. Just read the causes of the disease; one of them is said to be the difference in the length of the vein on the right side and on the left; now the greatest difference is not more than one-half of an inch; and can that be explanatory? Again, they would have it that there is something peculiar in the manner in which the veins empty themselves; on the right side the vein enters into the vena cava in an almost parallel direction with that vessel, whereby its emptying is more readily effected; while the vein of the left side empties into the emulgent vein in a direction almost perpendicular to the current. M. Nélaton said he had dissected many bodies, on purpose to examine this, and that it was very rare to find the vein emptying perpendicularly; that the spermatic vein curved so that the blood in both veins, the spermatic and renal, had nearly a parallel direction before joining. Com pression on the left vein, by the sigmoid flexure of the colon, is also given as a cause; but the veins have a small fibrous canal to protect them, and, moreover, it must not be believed that the dilatation of the veins exists only in the scrotum, for it continues all the way up the abdomen. Again, the accumulation of feces comes from constipation, and it is not at this epoch of life, from fifteen to thirty, which is when varicocele is formed, that persons are constipated. Orchitis is also given as a cause; but how often are persons found to have varicocele who have no idea of ever having had any inflammation of the testicle? Again, a person who had a varicocele, might be attacked with orchitis; and thus the dilatation of the veins be attributed to the inflammation. The true causes of the affection, M. Nélaton said, must be looked further for; they are as yet unknown.

In the treatment of varicocele, M. Nélaton declared he was very little the advocate of operations; the best thing to do, in his opinion, is to palliate. M. Richard had the idea of making a suspensory of the scrotum, he pushes up the contents, and applies below a ring of caoutchouc, to act as a constricting circle. He had made use of it on several occasions himself, and the patients found themselves perfectly well. He thought this plan should always be tried.

Of the operations employed for the radical cure, he said he would mention a few. Breschet made use of forceps, similar to Dupuytren's instrument, for the destruction of the spur of the intestine, in the cure of artificial anus; he cites eighty observations, in only one of which death took place. He had some cases of true success, that is to say, the patients were freed of their pains, without saying any more, for, although everybody says varicocele causes atrophy of the testicle, no one says anything about its cure by the operation. For himself, M. Nélaton said he had always seen the testicle remain of the same size.

M. Reynaud, of Toulon, passed a thread between the vas deferens and the spermatic vessels, and then, by tying the two ends of the thread, he gradually produced their section. To this operation, M. Ricord has brought an important modification, so as to divide the vessels, and not the skin. After isolating the vessels, by seizing the whole cord with force, between the thumb and fingers, and gradually opening them until the vas deferens escapes, he makes use of two needles, armed each with a double thread, and passes them through the same holes, one from one side, and one from the other, one behind the veins, the other before them. On each side there will be a loop and the two free ends; these free ends are then passed through the loops, and, by pulling them, the veins are compressed. The constriction is kept up by a sort of tourniquet, shaped like a horseshoe, over which the threads are carried, in order to avoid pressure upon the skin, intermediate to the places of puncture. The threads are removed when they are free, that is to say, when the veins have been ulcerated through.

M. Vidal makes use of a method by *twisting*, so that the vessels are not only divided, but are made to undergo a loss of substance. One metallic thread is passed before the veins, and another, smaller or larger, is passed behind them; they are then twisted around each other; his object in this is to make them undergo a loss of substance, for the simple section of the veins is often followed by a relapse. The threads, by this process of twisting, are closely pressed against each other, and a *tampon* placed externally is also made use of, to increase the pressure. It is, however, only a ligature, and the ligature of the veins is not without danger. M. Nélaton has seen one case of death from these metallic threads. This is why caustic is applied, and when the radical cure must be attempted, this is what he makes use of.

The instrument M. Nélaton employs in the application of the caustic, is composed of two plates, connected to each other by a curved spring, and that can be brought in contact by means of a screw. In one of the plates is a groove, containing Vienna paste, the caustic he prefers for this purpose. The part of the scrotum containing the veins being brought between the plates, the screw is tightened. The veins are flattened, and the scrotal envelops also; the veins are emptied of blood, and the action of the cremaster is arrested. The size of the opening in the porte-caustique can be regulated by a sliding plate. In this instrument, when he first used it, he had some trouble from the escape of the veins, in spite of the pressure; this is now avoided by a needle, which can be pushed through so as to prevent all danger of their escape. He has made use of it in urgent cases, in cases where the pain was so great that he was forced to try it. The instrument has given him very good results; the veins were obliterated, and remained so for quite a long time, and the patients did not suffer from the operation, which is the capital point. A diminution, and often cure of the pain, have always resulted; and he considers it a very good means of treatment.

In this case, he applied the ring of caoutchouc, after which the patient said he walked better, but complained of the irritation produced by the ring. M. Nélaton thought the substance made use of in vulcanizing the India-rubber was irritating. Upon relieving the constriction, by cutting half through the ring, the young man found himself quite comfortable, and in a few days left the hospital.

Hydrocele.

December, 1851. A man, forty-five years of age. Twelve years before, he had been operated upon for hydrocele, on the left side, by M. Cloquet, and there, over the superior portion of the epididymis, was a tumor, soft, fluctuating, and transparent. M. Nélaton believed this to be a cyst, formed by a portion of the tunica vaginalis, that had not been obliterated by the operation. The right side of the scrotum was translucid; in ascertaining which, he was very particular about the precaution of embracing the pedicle of the tumor firmly with the hand, in order to efface the wrinkles in the integuments. One portion of the collection of water was more projecting than the rest, where the tunica vaginalis forms a small mesentery to the body of the epididymis. There was a softish projection in the tumor, which he thought to be owing to this, that the common fibrous membrane (tunica vaginalis communis), had yielded to the pressure, and the serous membrane projected through the opening.

Both collections of liquid were evacuated by the one introduction of the trocar. In performing the operation, after the withdrawal of the trocar, the canula was deeply pushed in and left to itself, the skin not being held, as is generally done.

February, 1852. A case of hydrocele entered the hospital, in which the shape of the tumor was very singular. There was a large oval part below, and a narrow part above, as in a pear.

The inferior portion was filled with nothing but water; in the superior narrow portion was the testicle. M. Nélaton said this was not an encysted hydrocele of the cord, but that there had been a collection of fluid in the tunica vaginalis testis, and the lower part of it had burst.

The man was very old, and as the reproduction of the liquid would be slow, the palliative treatment was preferred; a simple puncture only was made, not followed by an injection, by which means he would be rendered comfortable for at least twelve months.

March, 1852. A case of hydrocele, not the one commonly met with, entered the hospital. He was a young man, who, two or three years before, had had an attack of gonorrhœa, followed by the *goutte militaire*, which had never left him. Some days previous, after a long walk, he had pains in the left testicle, followed by a swelling of the purse of that side.

When he came in, there was considerable tumefaction, extending from the inguinal canal to the base of the scrotum, regular in its form, and of considerable hardness. There were the symptoms of ordinary hydrocele, but, in general, the progress of that affection is slow; here, in addition to the rapidity of the accumulation, and consequent tension of the tunica vaginalis, were pains upon pressure, which do not usually exist. It was a case of acute hydrocele. It should be added, that the tumor was opaque, and almost always acute hydroceles are so, from the false membranes and the nature of the liquid thrown out from the serous surface.

The usual treatment of following the evacuation of the liquid by an injection, was not adopted in this instance. It was thought proper to limit it to the simple puncture, which proved all that was necessary for the cure of the patient.

June, 1853. A case of hydrocele, in which there was a prolongation up the cord to some distance; a not very uncommon circumstance. As the skin of the scrotum yields more readily than that of the inguinal region, at the junction of the two there was, as it were, a bridle, and without some attention, a hernia might have been thought to exist.

In regard to the liquid used as injection, after the evacuation of the contents of a hydrocele, M. Nélaton said that formerly wine had been used, but that since the writings of Velpeau, it had been almost abandoned; the injection of iodine, recommended by him, being generally preferred. There are, however, some cases in which, after the employment of iodine, no resorption is seen before the lapse of one month or six weeks. M. Denonvilliers, who had paid great attention to the subject, came to the conclusion, that when wine was used, the cure was much more rapid; and in regard to the objection of its being more painful than iodine, he says it is owing to using warm wine, and that when it is used cold, it is not more painful.

In this case, M. Nélaton made use of cold wine, making two injections, with a few moments of interval, as M. Denonvilliers recommends. The wine he used was the common red wine of the hospitals. The patient suffered more, and did not get well any sooner, than when iodine was used, so that the experiment was not repeated. The usual injection made use of was composed of one-third tincture of iodine, and two-thirds water, with some iodide of potassium to prevent the deposition of the iodine.

January, 1854. A stoutly built man, about forty-five years of age, entered with a hydrocele of the left side, that presented a slight circular constriction, separating the upper third from the lower two-thirds. It was everywhere perfectly transparent, and just at the narrowed part was an opacity, as if there was a partition in that place. M. Nélaton thought that a division did really exist there, making the hydrocele bi-locular. The testicle was in the lower portion, at about its centre, though nearer the anterior than the posterior surface.

He said he would plunge the trocar into the larger sac, and if the two communicated, well and good, the other would empty itself also; if they did not, he would puncture the second through the partition, which would be more simple than to puncture the scrotum twice. He has done this several times.

One puncture was sufficient to empty both the sacs, and the iodine was injected. It is not rare, particularly when the patient is old, to see the effusion, that occurs after the injection, lasting for six weeks; it is thought to be a relapse, but no, in a few days all goes away. The operation should not be repeated, M. Nélaton said, before four months have elapsed.

when but three years old; but it was evident, from the answe he gave to some questions put to him, that he had worn without paying attention as to whether the hernia was out not.

When he entered, there was no trace of a hernia, but on th left side there was a tumor, as large as a hen's egg, placed in th upper part of the purse; instead of going to the bottom of th purse, it tended to go backward toward the perineum. Just i front of it, at the upper half, was the lower portion of the spe matic cord, and at the lower, the testicle. This tumor was liqui the walls were soft, and fluctuation was perfect; and yet, thoug the greatest possible care was taken to distend the walls, and place the light favorably, it was impossible to produce indub table transparency. M. Nélaton did not think this opacity to b owing to the nature of the liquid, for spontaneous hæmatocele i too rare, and yet the thickness of the walls, as appreciated b pinching up the coverings of the liquid, did not seem sufficien to account for it. He, however, considered the walls, rather tha the nature of the contents, as its cause. He said it might be hydatid, as he had once met with a similar case, which proved t be one.

This tumor did not present the ordinary symptoms of encyste hydrocele of the cord. The manner in which the testicle de scends, and an inflammatory process obliterates the peritonea sac, are well known. Sometimes, however, this process i imperfect, and serous sacs are left, in which effusions can tak place. Tumors formed in this way, however, vary very little i their relations with other parts; experience has shown that whe they have acquired a large volume, they descend into the cul-de sac, between the globus major of the epididymis and the cord and there they remain.

When the epididymis has changed its position, as it sometime does, being anterior in place of being posterior to the body o the testicle, the tumor of a collection of water in the tunic vaginalis will appear to be behind, but in such cases the positio of the cord in front of it will clear up the diagnosis.

Whatever the case might be, the puncture of the tumor an the injection of iodine were what was to be done in its treatmen In regard to acephalocyst tumors, it is not, as yet, well known ho they behave under iodine injections; but, in some few cases, M. Nélaton has found that things went on just as when they were made into a serous cavity.

The introduction of the trocar proved this to be a case of spontaneous hæmatocele, and not an encysted hydrocele of the cord. M. Nélaton said he had neglected to consider the duration of the disease; it had lasted but eight months, and in that time the walls could not possibly have acquired such a thickness as not to be transparent. Moreover, for an hydatid to acquire the size of the tumor, two years would have been required. This shows how important it is, in every case, not to omit any consideration.

January, 1852. A young man, stoutly built, who had a tumor, obscure and difficult of diagnosis, in the right purse. Three years before, he said, he had a hernia upon that side, for which he had worn a truss for some time, but was forced to throw it away, as rather strangulating the hernia than retaining it. Two months before his entrance, he perceived a tumor developing itself in the right purse, very different from the other caused by the hernia.

The purse of the right side was much more voluminous than the other, and also than in the normal condition. The testicle was in the lowest part; and, about an inch above it, was a tumor, hard and globular, that resisted like a tissue, not like a liquid, and that did not permit the passage of the rays of light from a candle. Movable in the scrotum, it appeared to be free there, when examined, in relation to the other parts contained therein. At its superior part, it seemed to have a pedicle, which went as far as the inguinal canal; this pedicle was quite thick, and when the examination was carried further, it was seen to go into the abdomen, and, by depressing the walls, it could still be felt inside. If, however, the tumor was pressed, it fled away, and remained fixed in the original canal, while, at the same time, the pedicle remained stationary, so that it was not intimately attached to it. The tumor was not, then, as it had at first appeared, a hernia of the epiploon.

Encysted hydroceles of the cord enjoy an extreme mobility, and M. Nélaton said he would not be surprised if this tumor were one of them, existing at the same time with a hernia. For the non-existence of transparency, different reasons could be given. Tumors containing a bloody liquid, are found in the purse, and the effusion of such a liquid taking place in normal serous cavities, he did not see why it might not in the abnormal; and he diagnosed this case to be one of hæmatocele of the cord.

Happily, here the diagnosis was not very important, and there was no inconvenience in temporization. The boy was told to leave the tumor in the scrotum, and not in the inguinal canal, so that if at any time, from its enlargement, an operation would be necessary, it could be more easily executed.

Before leaving the subject of affections of the testicle, and of tumors having their origin in the parts contained in the scrotum, it may be proper to add some observations upon syphilitic affection of the testicle, derived from the clinics of M. Ricord, in whose wards, to use his own expression, it "sometimes rains testicles." What M. Ricord says is most highly valued, and most properly so, for it is founded upon vast experience; to use again his own expression, he is "the executor and promulgator of laws, of which his wards are the legislative chambers."

As a tertiary symptom of syphilis, or rather as one of transition between the secondary and the tertiary symptoms, is an affection of the testicle now well recognized as a manifestation of constitutional syphilis. It can take place after a regular succession of symptoms; or, it may be the first, being caused by inheritance. He has never seen it occur before the fifth month after the appearance of the primary chancre. With the law of symmetry belonging to syphilis, it can attack the two testicles at the same time, or one after the other.

Of the nocturnal lumbar pains, of which so much has been said, as prodromes of the affection, it is necessary to be defiant, for it has always been sought to find *nocturnal* pains in syphilitic affections, because, probably, the disease has generally been caught in the night. This pain in the loins, as initial, is the exception; afterward, when the tumor becomes very large, the pain of the dragging, of the weight, takes place.

This affection commences without being perceived; the patient discovers it by chance. Some induration is found *on the body* of the testicle. If there is one law in surgery, it is this, that it is the body at first, and nothing but the body, that constitutional syphilis attacks. Small bands of induration are found—sometimes there are only small points; the word tubercle, M. Ricord says he is afraid to utter, it is one that has been so much abused. It is a sort of apoplexy; a fibro-plastic matter is effused, by which the seminal tubes are displaced. If, as the disease progresses, that which takes place in the epididymis is noticed, it will generally be found, little by little, to disappear, and without previously being engorged. There is nothing in the lymphatics, nor in the vas deferens; the disease is limited absolutely to the testicle.

At a certain period of the affection, the normal sensibility of the testicle becomes greater; this does not mean that it is the diseased portion that causes the suffering, but the healthy portion; and the greater the portion of the seminiferous ducts remaining healthy, the greater the suffering.

Sometimes the testicle is totally lost, without having undergone any change in volume. Sometimes, indeed, there is atrophy of the testicle; it disappears entirely; but there are circumstances in which the testicle passes into the fibro-plastic condition, and remains of the same size, without increasing, without diminishing, and without giving rise to any pain.

In some cases, there is hydrocele, but there is no lesion of the tunica vaginalis; it is never specific.

The seminal fluid diminishes in proportion to the extent of the lesion; he has never found it sanious, or bloody; the spermatozoa are not so numerous. In order to study this, both testicles must be attacked, for one testicle remaining perfectly healthy, the alteration is not perceived.

In regard to the duration of the affection, there is nothing precise; it is undetermined. The march of the affection is essentially chronic, and it very rarely terminates by suppuration, or by spontaneous resolution. The diagnosis of syphilitic sarcocele, at the present day, can be made with much precision, though in some cases there may be doubts. The touchstone of Dupuytren was mercury; and *whenever the surgeon meets with an engorgement of the testicle, whose diagnosis is doubtful, a rational antisyphilitic treatment should be had recourse to, before coming to any operation.*

It must be remembered that syphilitic sarcocele can be met with, coexisting with other affections of the testicle, acute or chronic, epididymitis, hydrocele, &c.; it can give rise in the scrofulous to the evolution of tubercles, or to the different varieties of cancer in those predisposed to it.

The affections most easily confounded with it, are scrofulous or tuberculous sarcocele, and cancerous sarcocele. Cancer is azygos, not symmetrical; it is mono-testicular. Both scrofula and syphilis can attack both testicles at the same time, or but one. In syphilitic sarcocele the body of the testicle is first attacked, and *only the body*. It is not only syphilis that thus commences; cancer does so also. When, therefore, the body is affected, and there is nothing in the epididymis, it is either cancer or syphilis. For himself, M. Ricord says he has never found the true tubercle in the body of the testicle, without finding it in the epididymis, nor has he ever seen the epididymis affected without the body being afterward attacked. Tuberculous engorgements commence in the upper part of the epididymis, gonorrhœal engorgements in the lower.

Lumbar pains, in general nocturnal, are a true exception as prodromes of syphilitic affection, but they sometimes are met with; in the two others, they *never* are. The more the testicle is lost in syphilis, the less the pain; if it become again painful, it is a good sign; it is because it is recovering. In cancer, the pains increase, and become greater and greater at the periods of most advanced degeneration. In syphilitic sarcocele, there is no suppuration.

In regard to the *ways of propagation*, the syphilitic sarcocele remains in the tunica vaginalis, the tuberculous is propagated into the vas deferens, the seminal vesicles are engorged, &c., cancer follows the passage of the vessels of the lymphatics.

The form of the three affections is different. Tuberculous sarcocele is always lumpy, *before*, *during*, and *afterward;* cancerous is smooth at first, but finishes by becoming lumpy; the syphilitic are lumpy, but differently from the others. The lumps are not outside, they are inside; and the tumor finally becomes free from them—it becomes uniform. The other forms of sarcocele become more and more lumpy.

As to the prognosis, syphilitic sarcocele is essentially curable;

the more the organ is sensible, the more the patient suffers, the greater the chance of recovery. Tubercular sarcocele, in accordance with the general law in respect to these affections, is mortal; cancerous sarcocele is mortal also.

It should be added that the syphilitic sarcocele never becomes as large as the others, only becoming four, five, or six times larger than the normal testicle.

One lesion, very easily confounded with this affection, is hæmatocele; it begins slowly in the tunica vaginalis; the epididymis is not affected; there is no engorgement of the vas deferens, or of the lymphatics. If there be any doubt, an exploring needle should be introduced, and that decides the question.

The *Memoir* of M. Gosselin, referred to by M. Nélaton, is entitled "Researches on the Pseudo-membranous Thickening of the Tunica Vaginalis in Hydrocele and Hæmatocele, and on its Treatment;" it is to be found in the *Archives Générales*, for September, 1851.

All authors mention the difficulties in diagnosis caused by this alteration, and notice that hydrocele thus complicated resists the treatment usually employed, that of injection, and demands more complicated operations, such as simple or multiple incisions, excision, or even castration. The thickening is owing to organized false membranes, the product of inflammation. In the tunica vaginalis, as elsewhere, in consequence of greater vascularization, the surface allows a plastic matter to exude, which becomes vascular, condenses, and is transformed gradually into a tissue, more or less analogous to fibrous tissue. The persistence of the inflammation and of the plastic exudation leads to the formation of stratified layers. The causes, therefore, of the pseudo-membranous thickening are all those that can give rise to a chronic inflammation of the tunica vaginalis. The nature of the contained liquid is secondary and accessory; if the vascularization is not very abundant, it remains serous, and more or less deeply yellow; if the vascularization of the tunica vaginalis or of the false membrane is very marked; above all, if the parts are repeatedly pressed, it is brownish and sanguinolent.

The diagnosis of the affection is often obscure, and generally becomes positive only after an exploring puncture, which, after having given issue to a brownish liquid, permits the envelops to be pinched between the fingers, and their thickness and consistence appreciated. This exploring puncture, however, had best not be made until the surgeon is about to proceed with the definite operation.

Beside incommoding the patient by its weight, sometimes by pain, and resisting topical applications and general medications, the affection is principally serious, from the fact that it demands a more complicated operation than simple hydrocele, and from the fact, also, that the operations performed for its relief are sometimes followed by serious accidents, and even terminate fatally. These peculiarities are easily explained by the presence of the false membrane, which with difficulty takes on adhesive inflammation, and its suppuration is accompanied but very slowly with the formation of fleshy granulations. For this reason, the cicatrices are slowly formed, are preceded by fistulas of long duration, or, the inflammation becoming too intense, it terminates by the gangrene and the elimination of the false membrane, and then the general accidents are more serious.

In the treatment of these cases, all the curative operations proposed for hydrocele have been employed; puncture, injection, simple incision, excision, multiple incisions with the seton, and castration, have all been practised; and, without examining them in detail, suffice it to say that castration is the operation which the best surgeons of the present day have preferred. Much superior to all the others in safety and in rapidity of cure, it has the great inconvenience of obliging the patient to undergo a painful sacrifice. An operation, therefore, by which the patient would be freed from the tumor, not more dangerous than castration, and which would cure them as speedily, leaving the testicle and its dependencies intact, is one greatly to be desired.

Now, the inflexibility of the walls, the dangers of the consecutive inflammation, the slowness of the cicatrization, are all due to the presence of a badly organized false membrane. This false membrane is not very adherent. Remove it, without removing any of the natural parts, and the most urgent indication is fulfilled. This is the object proposed by the operation, called by M. Gosselin, *ablation of the false membrane, or decortication*, and which is performed as follows:—

If the exploring puncture has not yet been made, it is practised in the inferior parts of the tumor. As soon as a sufficient quantity of liquid has escaped to admit of a correct appreciation of the thickness of the walls, the canula is withdrawn. It is well to leave in the sac a certain quantity of liquid, in order to preserve more surely the testicle, and then the curative operation is at once proceeded with. If the exploring puncture has been made some days before, this preliminary would be useless.

The position of the testicle being determined, which is done chiefly by the peculiar pain caused by pressure, the first part of the operation is the *opening of the sac.* The tumor being held as tense as possible, at the anterior part, and on its whole length a vertical incision is made, and the tissues afterward divided, layer by layer. When the liquid escapes, the opening is enlarged by means of a probe-pointed bistoury. Of course, the surgeon will proceed with the greatest care, as the testicle may be situated in the anterior portion of the envelops.

The second part of the operation is *the loosening of the false membrane.* This might be done with the scalpel; but it is done most surely and most rapidly by making use of the fingers or any other blunt instrument, as is done in detaching the skin of an orange or a lemon. In fact, slight tractions, combined with the interposition of any instrument between the false membrane and the serous membrane, are sufficient to tear the soft adhesions that unite them. On each side of the incision the separation is thus made, stopping at the posterior part, in the neighborhood of the testicle, where the false membrane is more adherent.

The third part is *the excision.* By means of the scissors, the false membrane is cut away, at the point where it adheres, taking care not to comprise the other tissues in the section.

The bottom of the wound left by this operation is the natural sero-fibrous tissue, slighty thickened in some cases, but not transformed into thick and inflexible matter; it covers itself promptly with healthy granulations, and retracts to complete the cicatrization.

The dressing is the same as after castration, that is to say, in the bottom of the cavity a little dry lint, over that a piece of linen spread with cerate, and compresses, held in place by a triangular bandage. Care, moreover, should be taken to keep the parts elevated, as in all operations practised on the scrotum.

The principal advantages of this operation are, not to expose to the lesion the secreting and excreting organs of the sperm; to avoid serious inflammatory accidents, as are observed after simple incisions; and to procure a cure as prompt as that procured by castration.

CHAPTER XXI.

AFFECTIONS OF THE BLADDER.

STONE IN THE BLADDER.

Lateral Operation.

APRIL, 1852. A man, fifty-nine years of age, with every appearance of strength and good health. Seven years before, for the first time, he noticed that he passed some sand in his urine; still later, he had nephritic colics that appeared to have their origin principally in the left kidney, and after them he passed a larger piece of gravel than usual. The symptoms of stone in the bladder went on increasing, the passage of blood with the urine, &c.

In this case, there were hereditary antecedents, for two of the brothers of this patient had been similarly affected; one was dead, after being cut at six years of age; the other was still living with a calculus.

By the introduction of a sound, a stone was detected in the bladder, of considerable size, one inch and three-fifths at least in diameter, and believed from percussion to be hard. The bladder was of a medium capacity, with some hypertrophy of the muscular columns. The prostate was somewhat enlarged.

For the removal of this stone, M. Nélaton preferred lithotomy, for the calculus was large and hard, and consequently it would have been necessary to have recourse to lithotrity seven or eight times, which, although the most simple operation in the world, the first time it is performed, becomes exceedingly dangerous when many times repeated. Many patients who die after lithotrity, die from nephritis, and the surgeon greatly exposes them to it, by repeatedly introducing instruments into the bladder. The increased size of the prostate is also a condition unfavorable to crushing the stone.

M. Nélaton performed the usual lateral operation, the one called by the French the *lateralized*, and extracted the stone. During the operation, nothing extraordinary occurred, except a very considerable flow of blood. Everything went on very well until the fourth day, when there was a hemorrhage, which, however, was arrested by the action of cold. The next day it returned, and was very considerable. In consecutive hemorrhages, as a general rule, M. Nélaton believes the best proceeding to be the ligature of the artery, notwithstanding the suppuration. He therefore tied a vessel in the wound from which the blood was oozing, but the blood continued to flow from the surface of the incision as from a sponge. The actual cautery was then applied; in doing so, that which has so often been noticed was observed at the approach of the hot iron; the blood poured forth very forcibly, in a crowd of arterial jets. In making the application, it was necessary to protect the upper surface of the urethra, which was open. Under the influence of this cauterization, the hemorrhage was in great part arrested, but an oozing still continued, to stop which he had recourse to the *catheter à chemise.* A canula is taken, around which a compress is so arranged as to fall like a parachute; by stuffing a quantity of charpie inside, a pressure is exerted on the sides of the opening, and the canula permits the urine to flow freely out. By this means, the hemorrhage was arrested, but the man died with symptoms of complete adynamia.

At the autopsy, the wound was found to be situated in the most proper position; the incision of the neck of the bladder was not very extensive, and in the bladder were no signs of inflammation, no signs of softening. In the bladder were found several small calculi. There was nothing in the cellular tissue of the pelvis, nor in the peritoneum. Nothing was found in any part capable of explaining his death. The kidneys were congested; above all, the left one; the one in which he used to feel the most pain, and it contained several calculi. The small calculi found in the bladder were supposed to have descended there after the operation. The patient had died of hemorrhage; not as is seen in the great majority of cases immediately, but he had lost so much blood that he could not be restored. M. Nélaton said he believed that he had had to deal in this case with some peculiar condition of the arteries of the perineum.

July, 1852. A little boy, eight years of age, of wretched appearance, for which there were several reasons, the chief of which were his social conditions; his father, he said, was in the Conciergerie (a miserable prison in Paris), and he was left to take care of himself. It is said that children with calculus present a certain arrest of development.

Of the causes of the disease in this case, M. Nélaton was unable to acquire any information; as to any hereditary predisposition, the poor little fellow could say nothing, nor was he aware of the introduction of any foreign body. It is a rare thing to see a calculus in a child brought up in ease; and in old persons, it is more often seen in the rich than in the poor.

The penis presented a remarkable development, as is generally observed in similar cases of the affection. The boy said he was troubled with prolapsus of the rectum, which is often seen in such cases; it came out to the extent of about two inches, and in a few moments the contraction of the longitudinal muscular fibres drew it in again. There was pain in passing the urine, and the end of the glans was pointed out as the spot where it was most severe. It was necessary, however, to obtain physical proof of the existence of a calculus, for sometimes all these symptoms exist, and the child recovers from them. Upon the introduction of a sound, a stone was at once encountered, in diameter about one inch, and rough and unequal on the surface. M. Nélaton thought it to be a mulberry calculus. He introduced his finger into the rectum, wishing to touch it through the bas-fond of the bladder and the intestinal canal, but he was unable to do so. It is, however, quite a good method of exploration, above all when the calculus is rather large.

In this case lithotomy was decided upon, and this operation was preferred for the following reasons: First, the age of the patient. At the commencement of lithotrity, this operation was believed to be *impossible* in children; it was, however, soon afterward performed, and principally by M. Sigalas. In the cases reported by this surgeon, however, many things are omitted; sufficient details are not given; it is not said whether the stones were hard, whether they were large, &c., so that it is impossible to judge from them. Even the greatest partisans of lithotrity prefer lithotomy in children. The position of the bladder in a child, his inability to undergo repeated introductions of the instrument, the necessary smallness of the instrument, the size of the urethra, and the arrest therein of the fragments, are some of the objections. Moreover, the operation of lithotomy succeeds very well in children; about fourteen out of fifteen get well.

This little fellow was operated upon by the lateral operation. As usual, there was at first flow of urine by the wound, in a few days by the penis, and then by the wound again. In a month he left perfectly well. M. Nélaton said he very probably would soon complain of incontinence of urine.

Lithotrity.

March, 1853. A man, with an affection of the prostate and also of the testicle; he had, moreover, a calculus in the bladder. The calculus would enter the urethra when he urinated, and stop the passage, being arrested at a stricture that existed in the canal. There were here two things to be done; one to dilate the canal, the other to break the stone. The dilatation was accomplished, but, nevertheless, the stone would not come out. M. Nélaton then seized it with a *brise pierre à cuillère*, for it seemed to be of a small size, and crushed it. From the position of the blades of the instrument, he judged it to have a diameter of one centimetre (two-fifths of an inch). A fragment of the stone was arrested, where they often are, toward the lower part of the glans. The forceps of Hunter, rather a bad instrument, were first used in order to extract it, but without success; he then made use of the *curette articuleé*, and, at the first attempt, brought away the fragment. After that, he passed his water without any pain.

In lithotrity, when you have to deal with a small calculus, everything is done with the greatest simplicity and safety; but it is altogether different, when, from the size of the stone, it is necessary to introduce your instrument repeatedly. After a second, third, or fourth attempt, accidents, and terrible accidents, are very apt to take place. But, recently, M. Nélaton said he had seen a case where everything went on perfectly well; after six sittings, the patient was completely relieved of his calculus, when an inflammation of the cellular tissue of the pelvis took place, and death soon resulted. He has seen other similar cases. True surgical talent is shown in choosing the proper cases for the different operations.

In this case, no bad symptom occurred; the patient was entirely relieved of the calculous affection.

High Operation.

March, 1853. A cabinet-maker, forty-two years of age; there was nothing peculiar in his appearance.

When asked if, as a child, he used to have difficulty in urinating, he answered negatively. Eighteen years before, he commenced to present a first symptom of calculus, namely, hæmaturia; without any appreciable cause, he suddenly expelled a large quantity of pure blood, of blood that afterward coagulated. Since that time, the symptoms of stone had become more and more pronounced. When inquiries were made to see if he had had the symptoms of nephritic colic, pains of great violence and of short duration, which seem to be localized in the region of one kidney, and to be propagated toward the testicle, retraction of the testicle, and vomitings, he answered that he never had experienced any, never at any epoch of his life. No small calculus, nor any fragment of one, had ever been passed from the urethra. It is well to know that sometimes the fragmentation of the calculus does take place in the bladder.

This man suffered intense pain after urinating, from the contraction of the bladder upon the foreign body it contains. The point at which he suffered most was well marked; it was at the extremity of the organ, just at the base of the frænum. There is often in calculus a sudden interruption of the jet while urinating, owing to the falling of the stone of its own weight upon the orifice of the urethra; it is, however, more common in a small stone than a large, and here it had never been noticed. There was a manifest alteration of the urine; it contained some pus. The man had always continued his occupation as a cabinetmaker.

A metallic sound was introduced into the bladder, which evidently contained a voluminous calculus. M. Nélaton sought to determine its size by making use of a sound curved at nearly a right angle; the curved portion was placed behind the stone, then disengaged, and on drawing it forward it was felt to be in contact with the stone for a distance of about two inches (five or six centimetres). From the examination, he thought there was but one.

The urethra was free; the prostate was very voluminous; the bladder was of a medium capacity, as was determined by the extent to which the sound could be moved. The walls of the bladder were healthy, being but very moderately inflamed.

M. Nélaton was very much hurried this morning, and was unable to speak as much at length upon the subject of the choice of the operation in this case as he would have desired. That lithotrity should not be chosen was evident from the size of the calculus, and this, the great size, induced him to prefer performing lithotomy above the pubis.

In regard to the mode of performing this operation, and the anatomy of the region, he said but a few words, and those most rapidly. When the bladder is very much distended, the highest part of it will not be in contact with the abdominal walls; but there will be a cul-de-sac of peritoneum between them. In different individuals there will be, of course, a difference in the thickness of the abdominal walls, depending chiefly on the quantity of fat in the subcutaneous fatty cellular tissue. The manner in which the aponeurosis descends upon the anterior part of the symphysis, and the existence of a small mass of fat behind the pyramidal muscle, to which Scarpa, particularly, has called attention, were remarked upon.

The capital objection to this operation is that it exposes the patient to the infiltration of urine; for if the operator does not pay most particular attention, he detaches the anterior face of the bladder from the symphysis. Although much pressed for time, he said he could not avoid making known to the class a modification of M. Vidal de Cassis, of performing the operation "*in two times.*" The operation *in two times* of the ancients was performed in the perineum; they counted *the first time*, the cutting down to the bladder; and *the second*, the extraction of the stone. M. Vidal, however, advised to cut as far as the bladder in the hypogastric region, and then to introduce some charpie to act as a foreign body, causing the suppuration of the wound, and the formation of a pyogenic membrane, a granular, protecting layer. When this membrane is perfectly constituted, you puncture the bladder as you would an abscess. The first application of this method was by M. Nélaton, and the patient died of a gangrenous inflammation of the wound. He was, however, so charmed with the modification that he practised it a second time, and with a similar result. M. Vidal himself performed the third operation, and acted by means of caustic; but he was not more fortunate than M. Nélaton. M. Minot has performed this operation twice, and in both cases with success; but he had a great deal of trouble in closing the wound. These are all the cases known, and, consequently, the question as to the utility of this modification of the operation is as yet unsettled. M. Nélaton himself was unwilling to repeat it. Very great care would be taken not to detach the bladder from the symphysis, and also not to relinquish the hold taken of it; as a consequence of which, M. Nélaton said he had witnessed the plunging of the fingers and the forceps behind the pubis, without their entering the bladder at all. The operation was then performed in the usual way, and an enormous stone was extracted.

At the end of forty-eight hours, the patient was dead, with the usual symptoms of urinary infiltration. At the autopsy, the cellular tissue was found to contain a reddish liquid, evidently urine and blood. The peritoneum had been pulled away from the bladder, for the space of only two-fifths of an inch; there was no opening into its cavity, and yet it contained blood, the existence of which could not be accounted for. The kidneys, &c., were healthy.

July, 1853. A man, forty-eight years of age, and stoutly built. In 1832, in Portugal, he was struck by a ball at the point of union of the left thigh with the perineum; it followed an oblique course backward and toward the right side, and came out at the summit of the right buttock. There was loss of consciousness during several days, but he knows that eight days afterward he passed his urine by the hole at which the ball had entered, by the one where it came out, and by the anus. He urinated with much difficulty, and had to have a catheter introduced; his report of his case was very confused, but it appeared that he was unable to keep the instrument in the urethra. After some time, a small splinter of bone appeared at the orifice where the ball had entered, and was extracted. Since that time he had urinated with greater or less difficulty; during the last four months, the difficulty has been increasing.

When he entered the wards, on introducing a finger into the anus, a resistance was felt as if the orifice were too narrow; in the rectum, in front, was found a very deep depression, in which a whole phalanx could be lodged, surrounded by hardened tissue, and in the bottom something small and hard was felt, upon touching which, the patient said, you were touching his urethra. The rest of the rectum was healthy. The prostate was so small that M. Nélaton declared that it was known to exist more by your anatomy than by your feeling it. To pass his urine, the man was forced to place himself upon his hands and feet; it was impossible for him to accomplish it when either standing or kneeling. In this strange position, after much straining, it flowed slowly, mixed with blood and an abundance of mucus. When thus placed, he pressed and rubbed the left ischiatic tuberosity, which operation, he insisted, facilitated the passage of the urine. The day of his entrance into the hospital, a bougie, one-eighth of an inch in diameter, was introduced through the urethra into the bladder; the day after, not even one filiform could be passed; the next day, two were passed, about the ninth of an inch in diameter; but the fourth day, it was impossible to introduce anything whatever.

The diagnosis in this case was, then, not yet perfect, for it had, so far, been impossible to introduce a metallic sound into the bladder. The urethra in this case had been wounded, and it is in such cases that these impassable strictures are met with. M. Nélaton remembered a case in which, after death, the parts had been taken to the Society of Surgery, and not one of the members was able to pass an instrument through the urethra, and yet, during life, the patient had been able to urinate. Upon dissecting the specimen, the canal was found, in a certain spot, to be turned completely backward, for a distance of about half an inch, and, of course, a bougie introduced anteriorly could not be moved in that direction. In that case, also, the stricture had been the result of a gunshot wound.

The man's urine was mixed with mucus and blood, and its evacuation was not only difficult, but extremely painful; this could not be explained by the condition of the urethra; it must have proceeded from the bladder. Although there might have been other causes, M. Nélaton thought it owing to the existence of a foreign body, which might have been a calculus, but he was inclined to think it a fragment of bone that had penetrated there.

What was to be done in such a case? The first thing was to enlarge the urethra; the next was to find the foreign body in the bladder. No one knows what means will prove successful in passing such strictures; unable to pass a sound, M. Nélaton employed forcible injections of oil, and after the liquid had been held for some time in the urethra, he was able to pass a very small instrument. At the end of ten days, a sound, the fifth of an inch in diameter, was introduced, and the day after that he commenced to pass a great number of very small calculi; fifty coming away in the course of twenty-four hours. The size of the calculi that came away continued to increase in proportion to the dilatation of the canal. M. Nélaton said that as soon as possible he would introduce a catheter *with two currents*, and if that did not suffice, he would make use of a *brise-pierre*, not to break, but to pull away the stones.

The summer vacation commenced just at this time, and I am unable to say how this case terminated.

Through the Rectum.

July, 1853. A man, in whom it was very easy to determine the existence of a calculus. When questioned as to any hereditary predisposition to stone, he always returned negative answers, nor did he admit the existence of any gouty affection in himself or relatives. In regard to the cause of the affection in this case, nothing can be discovered.

The patient said that, fourteen years before, his urine contained gravel, but as to its appearance, he could tell nothing, except that it was yellowish. From this condition of his urine, he experienced no inconvenience, never being obliged to stop work, and yet he said that each time he urinated, he passed a teaspoonful of sand. Eight months before coming to the hospital (it must be remembered that this is the patient's account), he stopped passing the sand, and the symptoms he then complained of commenced. This occurred without his having committed any excesses, without having been riding, in short, without any known cause. He commenced to pass blood, and the urine since then has always been turbid and opaline. His desire to pass his water had become more and more frequent and pressing, so that he then was compelled to do so every quarter of an hour. At the same time, he had observed a great change in his constitution; he had become weaker and thinner; he was not, however, emaciated. In the other organs, in the stomach, kidneys, &c., nothing could be detected.

When a sound was introduced into the urethra, no stricture was found, yet throughout the whole of the membranous and spongy portions it was felt to be more narrow than usual. At the prostatic portion, every time that the sound was pushed so far, a foreign body was detected; there were evidently one or more calculi there. Touched by the rectum, a new series of phenomena showed themselves. Whenever the rectal face of the urethra was pressed, a peculiar sensation, one arising from the rubbing together of many fragments, was distinctly experienced. When the finger was so placed as to touch the anterior extremity of the prostate, and a sound was passed into the urethra until the point of the finger was touched, a very slight push of the instrument at once brought it in contact with a stone. There were calculi, then, in the prostate. The wall between the rectum and the urethra was so thin that it seemed to indicate a dilatation of those parts. An instrument of a peculiar form was introduced, a small portion of the extremity of a straight sound being bent at a right angle, and when this portion was in the prostatic region of the urethra, a movement of rotation was *easily* made. This experiment is very important, for it shows that there was not only a dilatation, which is very often seen, but that there was a true *prostatic pocket*. Many a young surgeon has thought his *brise-pierre* to be in the bladder when it was in the prostatic portion of the urethra, dilated. The urethra, then, was narrow in the spongy and membranous portions; and in the prostatic, which was dilated, forming a true pocket, there were several small calculi. In the bladder there was a large calculus, whose exact dimensions it was impossible to measure, owing to the very great contractions of that organ. The sound, however, showed that it was hard and of very considerable size, and the finger in the rectum also felt a very large mass.

M. Nélaton believed the small stones in the pocket of the prostate to be fragments, which had been deposited there after *the spontaneous fragmentation of the large calculus in the bladder.* The patient had in his possession a small fragment, evidently a shell from a large mass. M. Nélaton said that calculi in the bladder seem sometimes to be broken up by an *interior* force.

What was to be done in this case? To operate with crushing instruments, it would be necessary to dilate the urethra. This, however, would be but a delay in the relief of the patient, and it was not the true reason for rejecting lithotrity in this case. The stone here was very large, and for its destruction many sittings would be required; this, with the fact that the bladder was very irregular and diseased, were the reasons on account of which it was necessary to reject that operation. M. Nélaton would not perform the high operation here, not because he thought it a bad operation, but for particular reasons. On account of the existence of the *prostatic* pouch, an incision *there* is what was needed in this case, and the question was, whether this incision was to be made by the rectum or by the perineum. He said that, in these cases, too much has been done for the sake of external appearances, to the detriment of the patient; that the operation ought to be performed very slowly, and that the next time he was called upon to perform lithotomy, he would do it in the following manner:—

After going over the anatomy of the region, he said he proposed to make a curved incision, the centre of which would be at the middle line of the perineum, through the skin and the aponeuroses, until the anterior part of the sphincter ani would be discovered. This done, with the curved scissors he would proceed in the search of the urethra; if he came upon the bulb, he could easily avoid it. The canal of the urethra being thus found and opened, the lithotome could be introduced, and the operation easily finished. In the present instance, however, there were some peculiarities, requiring a particular operation.

In the dilatation of the anus for fissure,[1] every one has been struck with the condition in which the rectum remains for some time; the anterior part of the rectum can be seen as well as the perineum. The peculiarities of this case appeared clearly to indicate the making of the incision through the rectum. The objection to such an operation is the persistence of vesico-rectal fistula. This might possibly result in this case, but it was not likely to do so; and, besides, even if it should, it admits of cure, for now-a-days the rectum can be easily seen, it can be cauterized, or even autoplasty can be performed; and, again, even admitting a fistula to be left, it has been known to exist in individuals without annoying them very much. M. Nélaton said, therefore, that he would dilate the rectum, cut down just before the prostatic portion of the urethra, and, introducing the lithotome, would make a lateral opening through the prostate. He did not anticipate any difficulty in the operation from the size of the stone.

After the dilatation of the rectum, M. Nélaton was unable to see clearly the anterior part of the rectum, as he had expected, for the patient, to whom chloroform had been administered, in his struggles, caused a prolapsus of the rectum. He was, however, able to operate, although he could not see, for the walls were not thick, and the touch gave him the certitude that he was cutting properly. With one stroke of the bistoury he cut down upon the sound, through the rectum and the urethra; he then enlarged the opening by several strokes of the knife, and then gliding the lithotome through the opening into the bladder, he opened and withdrew it, cutting the lateral parts of the prostate. He found at once the calculus, which was at least two and a half inches in diameter. After it had been extracted, by introducing his finger into the prostatic pocket, he found numerous calculi, or rather fragments of another calculus. M. Leroy d'Etiolles, who was present at the operation, was afraid that all the fragments were not extracted, for, on putting them together, *a whole* was not formed; but M. Nélaton did not participate in his fears, as he thought these fragments had, at one time or other, been detached from the large calculus, upon which again deposits had been formed. At all events, it was impossible to find any more pieces. At a certain period of the operation, there was a slight hemorrhage; but no alarm was felt, for proceeding so carefully, he had the conviction of not having divided any important vessel; from prudence, however, in dressing the wound, charpie, &c., were introduced into the rectum.

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[1] See page 552.

The second day of the operation, the patient passed some blood with his urine, but there was nothing remarkable in his condition; the third and fourth days he continued doing very well. On the fifth day M. Nélaton thought there was every probability that he would recover; he had some desire to vomit, but that was attributed to some opium he had taken the previous evening; his pulse was good, and there was no sign of inflammation in the peritoneum, or the cellular tissue of the pelvis; in the operated region there was nothing notable, except a little sensibility in the hypogastric region; about the rectum and the perineum there was no tension, and pressure produced no pain; it was only in the region above the pubis. The patient continued doing exceedingly well until the seventh day, when about four o'clock in the afternoon he commenced to suffer, showing as the painful point the left renal region. In seeking to localize the pain, he supported pressure everywhere, except immediately at the kidneys. When questioned about it, he spoke of a pain that he had often felt there, and gave some details concerning it; he had felt it repeatedly for many years, and it always yielded to the application of leeches. This pain, M. Nélaton said, might have proceeded from an inflammation of the kidney or of the cellular tissue around; still, its frequent recurrence led him to believe it to be nephritis. Moreover, this inflammation of the kidney might be simple, or it might be dependent upon calculi in the kidney; this latter was very probable, and M. Nélaton's diagnosis was, that the man was laboring under acute nephritis, arising from a stone in the kidney. The prognosis in such cases is exceedingly grave; they generally terminate fatally, and in fact, without any experience, the condition of the patient on the eighth day showed enough. The constant vomiting of the previous day continued; he had dyspnœa, smallness of the pulse, and cold extremities, and also what the French call *the broken voice—la voix cassée*—the worst symptom in all such abdominal cases, as, for instance, in strangulated hernia. The only chance for the patient was, that this condition was depending upon nephritic colic. He was too feeble to leech, and opium only was given, in order to calm the vomiting, and to give him rest.

This patient died, but unfortunately, when the autopsy was made, I was unable to be present.

April, 1854. A man, forty-nine years of age, robust, and, but for his unequalled pusillanimity, an excellent subject for an operation.

The stone, so far as the size could be appreciated by a curved sound, had a diameter of about one inch. The walls of the bladder were perfectly supple; there was no purulent secretion, nor were there any spasmodic contractions. In the urethra there was a slight difficulty; it was narrow, so that a sound, three and a half lines in diameter, could not be introduced; this narrowness, however, existed only just at the entrance, and could be relieved at once by a small cut with the bistoury. The conditions for the operation of lithotrity were then most favorable; the age, the health, and the condition of the urinary organs; the *morale* of the individual was the only thing unfavorable, and on that account it was absolutely necessary to give chloroform.

To perform the operation, the patient would be placed as usual. Ten or twelve ounces of liquid, it is said, must be injected into the bladder before introducing the crushing instrument; a better rule is to desist when there is a sensation of a desire to urinate; but as this man would be asleep, it would be necessary to rely upon the quantity rather than the sensation. After this had been accomplished, an instrument to break the stone would be introduced.

At the present time, all straight instruments in lithotrity are abandoned, and those in use are the *percuteur* of Heurteloup, the *brise-pierre à cuillère*, the inventor of which cannot be exactly determined, and the instrument of Leroy d'Etiolles. This third instrument, the one preferred by M. Nélaton in the present instance, resembles the instrument of Heurteloup, but presents some differences, which make it at the same time an instrument of percussion and of pressure, so that a stone cannot only be broken to pieces by it, by the use of a hammer, but can also be reduced to powder, by the use of a screw, or pressure with the hand. He thought the stone could easily be seized, and to break it he would at first simply use his hand; if too hard, the pinion; and if the stone still resisted, he would use percussion. To make percussion, a hammer can be used, but he said he would use the *percuteur à détente*, invented by M. Leroy d'Etiolles, in which the *percuteur* is driven forward by a spring, which is let off by the touch of a trigger.

M. Leroy d'Etiolles, who was present, operated himself in this case; he broke the whole stone by pressure with his hand, but for some very small pieces, that were very resistant, he made use of his *percuteur à détente*, which seemed to perform its duty admirably. Not the shadow of a bad symptom followed this operation. The patient continued to pass fragments of the calculus for forty-eight hours, after which time he was completely free.

Catarrh of the Bladder.

December, 1851. A young man, twenty-two years of age, who had an affection very rarely seen at his time of life. Two years before, he had contracted a clap, in the treatment of which he made use of demulcent drinks for about ten days, when he commenced making injections of the sulphate of zinc, which caused very severe pain in the urethra. The purulent discharge still continuing, he took cubebs for eight days, and whilst he was taking the cubebs, the pain changed its position, going to the bladder. The secretion continued very abundant, and he was troubled with very painful erections in the night. He then made use of an electuary, containing copaiba, and got well. He remained well for five months, at the end of which time he contracted another clap; some drops of blood came from the urethra, and he suffered intensely at the neck of the bladder. He consulted M. Vidal, who applied leeches to the perineum, &c., and, after some days, he perceived that the urine contained pus brought from the bladder. The neck of the bladder was then cauterized with the nitrate of silver, which caused some amelioration for a few days, but the symptoms returned again to their former severity. Injections of nitrate of silver were thrown into the bladder, and baths of every kind were made use of, but with no benefit. He then applied to M. Ricord, who made use of injections of cold water, and the internal use of turpentine. Not finding himself benefited by this, he went to another physician, who employed the same means, with some slight modifications. He went, then, to another, who made use of injections of nitrate of silver into the bladder; he says he was cured for four days, but that all the symptoms returned again at the end of that time.

When he entered the hospital, he was suffering the greatest pain, and passing a very large quantity of pus in his urine. A plaster, with tartar emetic, was applied over the abdomen, in the hypogastric region, under the influence of which his pain went away, but soon returned again. He then, for seven or eight days, took Chopart's potion,[1] during which time there was a remarkable change, the pain entirely disappeared, and there was a great diminution in the quantity of pus. Unfortunately, the potion was so disagreeable that he could not continue it, and an injection of five grains of copaiba, mixed up with an egg, was substituted. This was continued for some time, when the patient left the wards. His condition had improved, but he was not cured.

Paralysis of the Bladder.

December, 1853. A young man, twenty-two years of age, of good muscular development, and stout, hearty appearance. He performed no work that could possibly have anything to do with his disease. He said that, one year before, he had had a clap, but it did not last long, and, since then, he had always urinated perfectly well, the urine flowing at once, in a full stream, and no drops coming out afterward into the pantaloon.

Six weeks ago, he went to bed perfectly well, and the next morning he was unable to pass his urine; he remained all the day in great pain, and then went to the hospital of La Pitié, where, next day, the surgeons introduced a catheter. The instrument was very easily introduced, and the urine flowed away at once. Since that time, he had incontinence of urine; it flowed away constantly, drop by drop. He remained but three days at La Pitié, and then left, without mentioning a word about his affection.

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[1] This celebrated potion is thus composed. It should be stated that nitric alcohol must not be confounded with spirits of nitric ether. It is prepared by mixing one part of alcohol, at 85°, with three of nitric acid, at 34°.

℞ Resin of Copaiba,
Rectified Alcohol,
Syrup of Balsam of Tolu,
Peppermint Water,
Orange Flower Water, } āā ℥ij.
Nitric Alcohol, ʒij.

From two to six spoonfuls to be taken during the day.

This affection can come from various causes, differing very much in their nature, and, in the first rank, are all that can present obstacles to the flow of the urine through the canal; the patient will then urinate by *overflow*, and will also be afflicted with retention. An examination was made, to see if the bladder was distended in this case; to see if there was any tumor in the hypogastric region. None was found there, but M. Nélaton said that, when the bladder was normally small, when it had not had time to distend, it might still be below the pubis, and the patient, nevertheless, urinate by *overflow*. He had met with such cases several times himself, and they have been noticed by Civiale and others. The catheter was very easily introduced, and the urine flowed through it, without any projection, drop by drop. The bladder had evidently lost the power of emptying itself, although very little water was contained therein, for even when, by the introduction of the catheter, the curves of the urethra had been destroyed, and an open canal was offered, it had not the power of forcing out its contents. There was, therefore, a loss of power in the walls of the bladder, and, as there was a true pissing by *overflow*, the bladder holding but little urine, and the urine flowing constantly away, there must have been paralysis also of the neck.

There was no peritonitis, for it could not pass unperceived; no perivesical phlegmasia. If it were an affection of the lower part of the spinal cord, there would be changes in other parts besides those of the bladder, and there were none; the movements of the lower limbs were perfect. All the muscles of those parts about the bladder, the acceleratores urinæ, the transversales perinei, the sphincters of the anus, &c., were in full power. The only muscles paralyzed were those animated by the nerves of organic life, and the disease then was a *partial paralysis of the nerves of organic life*, a disease not often seen, yet it is occasionally met with.

The paralysis of a muscle, after the section of a particular nerve, is easily understood, but it is very difficult to understand a partial paralysis from a general case, and yet cases of the kind abound. Every one has met with, for instance, a paralysis of the radial nerve, from the effect of lead upon the system, and also that of the third pair, in hysterical women. There is no reason, therefore, why, in this case, a partial paralysis should not be admitted.

To go back to some antecedents of this young man, he said that when young he had nocturnal incontinence of urine, which continued until he was eight years of age. There was something in him original, something congenital; it is probable that his bladder had always been small.

Jean Louis Petit classed cases of nocturnal incontinence in three categories: the sleepers, the dreamers, and the lazy. Asking this young man, he evidently belonged to the sleepers, for he never knew of what had occurred until the next morning, and never recollects dreaming of a wall or a pot. This fact seems to show that there was in the bladder a predisposition to incontinence.

The lower part of the rectum is supplied with nerves, coming also from the hypogastric plexus, and when asked, the patient said he had not been to stool for eight days. Now, this is what would occur if there were a loss of action in the rectal walls, as there is in the vesical. Retention of the fecal matters is characteristic of this, if they are hard; if they are soft or liquid, there is incontinence of them as there is of the urine. When asked if he recently had had diarrhœa, he said he had had it three times in the last six weeks, and that it was impossible for him to retain liquid feces. The diagnosis, then, was *paralysis of the body and neck of the bladder, and of the lower part of the rectum.*

What was to be done? In some patients, by allowing a catheter to remain in the bladder, you stimulate it into action, and M. Nélaton said that he would commence the treatment in this case by leaving one there for an hour. If nothing was gained by this means, he would have recourse to injections of cold water, repeated every day two or three times; to sulphur baths, to strychnia; and, if nothing succeeded, to passing a current of galvanic electricity through the bladder and rectum.

The catheter was introduced twice the first day, and left there for one hour each time. The next day there was a change;

when the catheter was introduced, the urine came out in a curve, and in the course of the day he was able to hold his urine for some moments. The third day he was still better; there was a projection of the urine. M. Nélaton said he would persist for some time with the use of the catheter, not being willing to employ two things at once, for he was desirous of knowing to what the effect was to be attributed. Nothing else was ever done, however, in the case, for the patient in a few days thought himself well enough to leave.

January, 1854. An old man, seventy-nine years of age, who had what is often seen in very aged persons—*retention of the urine.* There was a large tumor in the abdomen, and the urine was constantly dripping from the extremity of the penis. A catheter entered the bladder with extreme facility, and its contents poured out first in a jet, and at the end of a short time, drop by drop.

What was this retention owing to? Was it an affection of the prostate, or a want of action in the bladder? The facility with which the catheter was introduced indicated nothing; it often passes very easily when there is tumefaction of the prostate, for in such cases there is no stricture of the canal, only flattening and deviation. When, however, the instrument—which had quite an abrupt curve—was in the bladder, it was manœuvred in order to see the condition of the prostate. It was drawn forward, the curved end being up, as far as possible, and then turned round upon its axis. This was done without its being necessary to push it any further in, which would have been impossible had there been any tumefaction, where there often is, at the base of the prostate. This manœuvre can even show the extent of the tumefaction, the different lengths of the sound measuring the projection behind. There was no tumor, then, of the middle lobe of the prostate making a projection into the bladder, and the finger in the rectum showed nothing remarkable; there was no perceptible tumefaction of the whole organ. The obstacle to the flow of the urine was not then in the prostate, but was a want of action in the walls of the bladder.

This paralysis of the bladder would probably be very difficult to cure; it probably would not be cured at all; but the patient would be frequently sounded, and perhaps he could learn to do it for himself, and thus he would be made much more comfortable. It was not impossible that his bladder might regain its tone, and cases are met with in old persons where this takes place when the bladder has been well emptied.

The old man remained about two weeks in the hospital, and then left it in about the same condition.

June, 1853. An old man entered the hospital on account of an injury that had just happened to him. While carrying a heavy burden on his shoulders through a low passage, it struck the ceiling; he fell, and had to be lifted up and brought to the hospital. The accident had at once caused *weakness* of the lower extremities; not *complete paralysis*, for their sensibility was preserved. He was kept in bed, and blisters and other counter-irritants were made use of until M. Nélaton's return, for at that time, on account of illness, he was unable to attend to his duties.

When he came back, the weakness in the lower limbs was still remaining, but what chiefly attracted his attention, was the difficulty the patient experienced in voiding his feces and urine. He found his bladder largely distended, and for several days he had only urinated by the assistance of the catheter. Before the fall, the man said he passed his water very well, and *very often*; this would mean that he did not urinate well, for it showed that he had been unable to retain his water long. M. Nélaton passed a large catheter with the greatest facility through the urethra; there was no stricture in the canal. In the prostate, there was nothing pathological; the finger in the rectum showed it to be rather small, in spite of his age, and a sound in the bladder was moved in all directions without difficulty, showing that there was no hypertrophy of the third lobe, which sometimes forms a kind of valve. When the catheter was in the bladder, the urine was projected as far as usual from its orifice; the paralysis of that organ was therefore not complete. M. Nélaton spoke thus, because the bladder can be pushed by the intestines, and these by the abdominal walls and the diaphragm, and in this case, in spite of the projection of its contents, he could not but perceive a certain amount of inertia of its walls; and he was moreover strengthened in his opinion by the arrest in the rectum of the fecal matters. There was partial paralysis of the rectum and of the bladder, as well as of the lower limbs.

In addition to what had already been done, M. Nélaton gave ergot, which is said to produce contractility of the bladder, but with no good result. He afterward made use of injections of cold water, but with no benefit, and likewise of several of the remedies, until it remained to use electricity. Chopart was accustomed to use it in these cases, but now-a-days it is much better employed than formerly. In 1848, M. Michon, a man in whom the greatest confidence is felt, introduced a sound into the bladder and another into the rectum, and sent the current thus through the bas-fond of the bladder; two or three sittings, of two or three minutes each, brought back the contractility.

M. Nélaton introduced a sound beyond the prostate in the rectum, and another through the urethra into the bladder, and sent a galvanic current through for five minutes. The current traversed the bas-fond, and part of the prostate; there were movements of the muscles of the abdomen, and of the lower extremities; it was very painful, the man complained a great deal. The patient had to be sounded, as usual, until the third day, when he commenced to make his water for the first time for four weeks. The man suffered pain in his bladder, and M. Nélaton asked himself if the electricity had caused a slight cystitis, that had brought back the contractility of the organ. The man recovered his power over the bladder.

Disease of the Urinary Organs, causing Paralysis.

December, 1852. A man, about fifty years of age, entered the hospital to be treated for weakness in the lower extremities. To state his condition with more precision, there was paralysis of the right side; not complete, but the man hesitated, he could not sustain himself upon it. On the left side, the paralysis was less pronounced. The sensibility of the two sides was the same, and did not appear to be diminished.

He complained of a pain in the lumbar region, situated alongside of the vertebral column, and to the right; and when a strong pressure was made outside of the mass of muscles attached to the spine, the seat of the pain was found.

This man, whose history was well known to M. Nélaton, had had syphilitic affections several times, and he therefore gave him, at his entrance, mercurials and the iodide of potassium. The treatment was continued for some time, and nothing was gained.

The patient, complaining much of a difficulty in voiding his urine, his urethra was examined. A *slight* stricture was found, but after large bougies could be passed with ease, the difficulty still remained. A large catheter was then passed into the bladder, and when he tried to pass his water, it fell drop by drop from the extremity of the instrument. There was no active contraction of the bladder; there was inertia, want of action in that organ. In addition to the difficulty in voiding the urine, he complained of pain about his bladder, and the reason was found in the condition of the urine, which contained mucus, and, besides, pus; evidently there was some inflammation going on in the bladder.

M. Rayer, after Mr. Stanley, has had the opportunity of observing that individuals attacked with disease of the urinary organs often had paralysis; these phenomena occurring in an order inverse to what is usual, that is to say, the organs were affected first, and after that the paralysis took place. When, in these cases, the parts were examined after death, great and long-continued disease of the urinary organs was found, and nothing at all in the central organs of innervation.

The more M. Nélaton considered this case, the more confirmed he became in the opinion that the paralysis was symptomatic of the disease of the bladder. The man did not remain long enough in the ward to enable the effect of the treatment to throw any light upon the diagnosis.

Some very interesting reports of cases similar to this are to be found in *Graves's Clinical Notes.*

Cancer of the Bladder.

January, 1852. A man, forty-five years of age, of quite a good constitution, entered the hospital, as afflicted with hæmaturia. He had never in his life experienced any sickness of any importance. Twenty-five years before, he had a slight discharge from the urethra, but it soon ceased, and left behind it nothing, no day in great pain, and then went to the hospital of La Pitié, where, next day, the surgeons introduced a catheter. The instrument was very easily introduced, and the urine flowed away at once. Since that time, he had incontinence of urine; it flowed away constantly, drop by drop. He remained but three days at La Pitié, and then left, without mentioning a word about his affection.

This affection can come from various causes, differing very much in their nature, and, in the first rank, are all that can present obstacles to the flow of the urine through the canal; the patient will then urinate by *overflow*, and will also be afflicted with retention. An examination was made, to see if the bladder was distended in this case; to see if there was any tumor in the hypogastric region. None was found there, but M. Nélaton said that, when the bladder was normally small, when it had not had time to distend, it might still be below the pubis, and the patient, nevertheless, urinate by *overflow*. He had met with such cases several times himself, and they have been noticed by Civiale and others. The catheter was very easily introduced, and the urine flowed through it, without any projection, drop by drop. The bladder had evidently lost the power of emptying itself, although very little water was contained therein, for even when, by the introduction of the catheter, the curves of the urethra had been destroyed, and an open canal was offered, it had not the power of forcing out its contents. There was, therefore, a loss of power in the walls of the bladder, and, as there was a true pissing by *overflow*, the bladder holding but little urine, and the urine flowing constantly away, there must have been paralysis also of the neck.

There was no peritonitis, for it could not pass unperceived; no perivesical phlegmasia. If it were an affection of the lower part of the spinal cord, there would be changes in other parts besides those of the bladder, and there were none; the movements of the lower limbs were perfect. All the muscles of those parts about the bladder, the acceleratores urinæ, the transversales perinei, the sphincters of the anus, &c., were in full power. The only muscles paralyzed were those animated by the nerves of organic life, and the disease then was a *partial paralysis of the nerves of organic life*, a disease not often seen, yet it is occasionally met with.

The paralysis of a muscle, after the section of a particular nerve, is easily understood, but it is very difficult to understand extent, the movement could be executed, but it was prevented, on the anterior half of the other side, by the existence, there, of some body, as M. Nélaton believed. By the touch in the abdominal region, a rounded, abnormal relief, that did not exist on the right side, was discovered. When the finger was introduced into the rectum, and the other hand left in the hypogastric region, by pushing in either place, a mass was felt extending toward the rectum, and toward the symphysis pubis. The patient said, at the time, that he was in the habit of feeling pains precisely in that part.

M. Nélaton said that, in this case, he had to do with one of those cancerous tumors sometimes developed in the bladder. He was not exactly sure if it were prostatic or vesical, but as the prostate was not notably deformed, as it did not project toward the rectum, and as the canal of the urethra was not transported to one side or the other, he believed the tumor to be developed in the walls of the bladder.

While the catheter was in his bladder, the man said that he had already presented himself at the Hospital St. Louis, that a catheter had been introduced, and that afterward he had lost a great deal of blood. This is what takes place almost always in these cases.

The urine passed by the man was brownish, altered, and putrefied, as if there was a cancer in the bladder, ulcerated on its surface. M. Nélaton stated that, in such cases, it was not rare for small fragments of the mass to be voided with the urine, and then there is no difficulty as to the diagnosis.

The treatment of this case was simply palliative, consisting of drinks taken very abundantly, in order to have a kind of washing out of the bladder, to free it from the altered urine.

In the course of a few days, the correctness of the diagnosis was verified by the discharge from the urethra of fragments of matter, having the appearance of what is called encephaloid cancer. When submitted to the microscope, they were found to contain the elements of cancer; some cells, and a great number of nuclei.

After his admission into the hospital, this patient became rapidly worse and worse; his sufferings became intense, the cancer producing irritation, and consequent contraction of the diseased organ. The expulsion of the urine became very difficult, from the stoppage of the urethra by these fragments. At the end of nine days, he was having seven or eight stools a day, and always liquid. These cancers tend to ulcerate deeply, and, in addition to the causes of death attached to all cancers, we have, in these cases, to dread the formation of pelvic abscesses. The treatment was directed toward the easing of the pain, by suppositories of narcotic substances, and their application in the hypogastric region.

This man, who, when he entered, had the appearance of one who had a long time to live, died at the end of forty days. He had a little hæmaturia when he came in, but, with that exception, believed himself perfectly well.

At the autopsy, clots of blood were found in the bladder; and in that part of it in which M. Nélaton had supposed the cancerous tissue to exist, were soft, fungous *mamelons*, which were torn with the greatest facility. The origin of the disease was thought to have been, as it generally is, in the submucous tissue of the bladder. It should be added, that the same cancerous tissue was found in the kidney of the same side, that is to say, in the left kidney.

CHAPTER XXII.

AFFECTIONS OF THE GENITAL ORGANS OF THE FEMALE.

Obliteration of the Vagina.

JANUARY, 1853. A middle-aged woman, whose constitution seemed excellent. She had always enjoyed good health, until 1849, when she was attacked by cholera, and most seriously, for, during two days, she was without consciousness; on her recovery, she recognized something changed in her genital organs; her vagina was obliterated. That the vagina was open previously to the attack, there was no doubt, for she menstruated, and had sexual intercourse; since that time, she never had had her menses.

On examining the patient, by separating the labia majora, at a distance of about one inch from the vulva was found an obstacle, formed of bridles of tissue, &c., just as a cicatrix; the resistance of this membrane, or rather of this obstacle, was very strong. In the rectum, was a voluminous tumor, and it seemed as if the neck of the uterus was continuous with it, for at the highest part was a depression resembling it. The tumor extended into the hypogastric region; and when percussion was made there, the finger in the rectum felt the fluctuation. This tumor was thought to be caused by the retention of the menstrual discharge.

A young girl who has an obliteration of the vagina, does not perceive it before the age of menstruation; and, almost always, the first symptom is a difficulty of urinating; if an examination be made, the obliteration is found, causing pressure upon the urethra. The symptoms pass away, to return in another month, and they increase each time, for the menstrual blood thrown out is not all absorbed.

This is what had taken place, in this case, to form the tumor; in its formation the uterus was thought to have participated, for the part spoken of as feeling like a depression, when the finger was in the rectum, was quite hard—more so than a simple collection of liquid would be. A second tumor, soft and fluctuating, situated toward the left side of the abdomen, was also detected; this was thought to be a cyst of the ovary.

This collection of liquid it was necessary to evacuate, and, although much more easy to do so through the rectum, it should be done through the vagina. The obstacle would be pierced with a trocar, toward the posterior portion, for it would be much better to wound the rectum than the bladder; and then, after seeing what was inside, all that appeared necessary would be done immediately, and the parts held in separation.

This operation appears very simple, and yet it is not exempt from danger; an inflammation sometimes results, like that seen in confinement; and M. Nélaton said he had seen Dupuytren hesitate to operate, from this fear. He did not know if it was a peritonitis, for it was an open sac, exposed to the air, and the accidents of putrid infection were what were to be dreaded. M. Nélaton had himself performed the operation three times upon young girls, and in all of them these symptoms made their appearance; they all, however, terminated favorably.

At the introduction of the trocar, two-thirds of a litre, or nearly a pint and a half, of dark blood came away, and in proportion as it came out, the tumor disappeared, until at last the whole of it had gone. This liquid was excessively viscous, gluey; and this explained why the wave felt by the finger in the rectum, when the abdomen was struck, was almost imperceptible. Nothing took place during the first twenty-four hours, at the expiration of which time a speculum was introduced, and the spot where the trocar had penetrated being found, a director was passed, upon which a probe-pointed bistoury was glided, and by slight movements the opening was enlarged, until it had a diameter of four lines. This done, the lithotome was introduced, and a large lateral section made, wherein the finger could be moved with ease. The cavity behind the obstacle could thus be explored; the neck of the uterus was dilated, and one half of the length of the finger could be introduced therein, so that not only the upper part of the vagina, but the uterus also, was thought to be dilated. About three hours after this second operation, the patient commenced to lose blood, not like the other, but the blood that comes from a divided vessel, red, and clotted. To arrest this hemorrhage, a tampon was had recourse to; it did not, however, give rise to any fears. In the evening of the second day, the patient was uneasy, and the next day she was still worse; the symptoms were not those of peritonitis, the small pulse, &c., but rather those of putrid infection. These symptoms were combated by injections containing a small quantity of tincture of iodine, made every day into the cavity; and the patient was also several times placed in a bath, and the parts well irrigated.

An apparatus made of caoutchouc was made use of, in order to maintain the dilatation of the canal. At the end of five weeks the patient left, well. A very large gum-elastic bougie could be introduced into the vagina, and the menses had made their appearance with their normal characters.

July, 1853. A woman, twenty-nine years of age, and apparently well formed. At nineteen she had commenced to menstruate, and at the time of the menses she had never had any pain, nor noticed anything extraordinary; she never had any reason to suspect anything abnormal in her formation, until becoming engaged to be married, and, like a prudent woman, desiring to know if her genital organs were suitable, it was found, after several attempts, that they were not. The entrance of the vagina was as it should be, and the finger went in about one inch and a half, when it was found to terminate in a cul-de-sac; nothing could be felt to explain how the menstrual discharge had passed. In order to examine the condition of the deeply-seated parts, the finger was passed into the rectum, where nothing was found but what is seen in a well-formed woman; the uterus, neck, &c., were all of their normal form and dimensions. There was nothing like the collection of liquid, which existed in the case that had been in the wards some months previously. The vagina being carefully wiped, and examined by the speculum, a small hole was found, just large enough to admit a probe, from which mucus issued. The probe introduced was arrested at the distance of four lines; arrested, it was supposed, by the neck of the uterus. Desiring to know if this was but a narrow canal, leading at once into the cavity of the uterus, or if a cavity existed between the diaphragm and the womb, the probe was bent, and with it M. Nélaton was able to execute movements sufficient to convince him that a cavity existed behind the membrane.

Retention of urine, which in the generality of cases is the first symptom of obliteration of the vagina, had not existed in this case, and it should not have done so, for it is a result of a dilatation of the vagina behind the obstacle, by the accumulation of the menstrual discharge. Here, again, the obstacle was situated too high up above the neck of the bladder; it is generally but four lines from the orifice of the vagina, and the first effect of the dilatation of that canal is the flattening of the neck of the bladder. In this case, in consequence of the small hole in the obstacle, no dilatation had taken place.

The treatment of such a case would be very simple, a speculum would show the orifice, and then it could be enlarged with a bistoury. The operation would not be serious, for there is an immense difference between this and the opening of a cavity previously closed.

Quite large incisions were thus made into the diaphragm, and the finger having been introduced, another partition was found; in this, owing to the blood, it was impossible to detect an opening. At the end of a few days, when the bleeding and inflammation had ceased, a speculum was introduced, and by means of incisions practised with a probe-pointed bistoury to enlarge an opening then detected, M. Nélaton penetrated half an inch further, but still without meeting the neck of the uterus. In this condition, M. Nélaton left the patient, when he gave up the wards, during the summer vacation, and I do not know how the case terminated.

Affection of the Follicles of the Vagina.

November, 1853. A young woman, twenty years of age, entered the hospital on account of intolerable itching of the genital organs. She was not married, but it was the same as if she were. She said herself that two years before, there had been a lively inflammation of the external g questions put, with a view of determinin inflammation, she answered that there had heat, and swelling. Ever since that time feel pain and an itching there.

Upon examination, the external parts w mal, but in certain parts, situated on eith urinarius, were points of a lively red co corresponded to two depressions, so th from a distance, there appeared to be thr them being the orifice of the urethra. Wh by the fingers at the sides of these depre pus was made to come out. As to the sen their surface was so very small—only ab small instrument was taken in order to r different portions were then touched wit small depressions were found to be the bility.

Most patients with this affection compl passing their water; in this case it was no this woman the affection of the follicles greatest height. In some cases, they ca with men, connection is too painful for the whole neighboring region of the anus an state of lively irritation. In this case, the an insupportable itching; there were so pressure, some pus issued; there was some urinating, and, moreover, the affection was had lasted for two years.

These follicles are culs-de-sac, generall line to even four lines in depth; their de all in those placed at the sides of the u even sometimes branched. Beside those thra, there are others situated just at the diameter of the vulva, and there are, mor indeterminate points. All of these follicle

In regard to the diagnosis of the aff taken, the pus might be believed to come an urethral blennorrhagia be diagnosed. M. Robert, who has written a most excellent memoir on the affection, says that, when he first saw it, he thought he had to deal with small abscesses, that had opened and left fistulas.

This disease can become most terrible; lotions and similar applications only afford momentary relief, for they only touch the orifice of the follicles, and the surface of the whole follicle must be acted upon. M. Robert recognized the necessity of this, and advises laying open the whole, by means of incisions, and then applying your lotions; but this is much dreaded by the patients themselves, and, moreover, the incisions are hindrances to the surgeon, who wishes to modify the surface of the cavity. M. Nélaton takes a piece of Vienna paste, and by it destroys the lining membrane of the follicle, that is to say, he destroys the follicle itself; he never saw it to fail.

In making the application of the caustic, it was allowed to remain only one-tenth of the time it usually is; to see how Vienna paste will act, its effect should be witnessed upon such tissues. After this application, the parts were frequently bathed, and the patient soon left cured.

Hypertrophy of the Smaller Nymphæ.

January, 1854. A young woman, who had already been operated upon for an affection similar to the one she then had, but placed on the opposite side of the vulva.

The right lesser nympha was very large, the mucous membrane covering it was moist, and contained a number of small depressions; its consistence was quite firm, not much firmer than in the healthy state, and there was no œdema. The patient experienced no pain from the affection, except when the parts were rubbed in walking. The left nympha, the one that had already been operated upon, presented some augmentation of volume, but very little.

Deeper in the vulva all was healthy, except that at a spot a little external to the urethral orifice, were two little projections; one was smooth, and had the appearance of cartilage, but it was much less hard; the other was red, and granulated on the surface. There was no ulceration, no solution of continuity on the surface of either of these projections. This altered portion of the vulva had no continuity with the altered nymphæ. The patient had no pain anywhere, except, as was said before, when the parts were rubbed in walking. It should be added, that she had not been subject to repeated attacks of inflammation in these parts, which is a cause of hypertrophy in the lesser nymphæ.

This affection, evidently, could only be confounded with cancerous or cancroid affection. There are, however, two very important signs; cancroid affection is generally much harder than this, for the part affected here was quite supple; and again, it is always more or less *on the surface*, so that in a dry place there are scabs, and in a moist one, like the present, there are bloody spots. Moreover, in this case there was no pain, and cancroid affection gives rise to prickings, or to lancinating pains.

This case was one, M. Nélaton said, of that affection so well described by M. Huguier, called esthiomène (*esthiein*, *to devour*).

The best thing to be done was to excise the enlargement. In performing this operation, for which the scissors may be used, there is often more hemorrhage than had been expected; if it should occur here, the actual cautery would be applied. M. Nélaton showed, also, a painting, representing this affection as it had appeared in a *femme publique*, who was deprived by it, from the narrowing it caused of the vulva, of her means of subsistence. That case had been operated upon a year before, and as yet there had been no relapse.

After removing as much as was thought proper with the scissors, dry lint was applied over the surface of the wound. In a few days it healed, and the patient left the hospital.

The portion of the nympha excised, examined under the microscope with M. Robin, showed the disease to have been but a simple enlargement of that body.

The disease described by M. Huguier, esthiomène, for which M. Nélaton had mistaken this affection, is a true lupus. The elements of the tissue composing such tumors are fusiform fibres, fibres of elastic cellular tissue, and masses of epithelial cells. The esthiomène of the vulva, therefore, is a mixed tumor—fibro-plastic, and epithelial. (See *Lebert*, *sur les Maladies Scrofuleuses et Tuberculeuses*, p. 275.)

Vesico-Vaginal Fistula.

July, 1852. A young girl, who had been confined for the first time, two and a half months before her entrance. Her labor had been very painful; and after having remained two days at home, she had entered the wards of M. Dubois. There they found the pelvis to be too narrow, and delivered the child by forceps. Nothing whatever was noticed in what took place after the delivery; but when she went home, she noticed that her urine was continually flowing from the vagina. Returning to the hospital, M. Dubois found at once a fistula leading from the bladder to the vagina, and sent the patient into the surgical wards of M. Nélaton.

A speculum being introduced, at a distance of four lines from the mouth of the uterus, a small red point was seen, of a *cherry red*, which is not the color of the mucous membrane of the vagina, but of the bladder. The speculum still retained in the vagina, a catheter was introduced into the bladder, through which, when water was injected, it was seen to come out into the vagina, by the cherry-red point spoken of. As, perhaps, a vesico-uterine fistula also existed, an injection of milk was made, for in such cases the surgeon cannot trust to water; but none made its appearance at the mouth of the uterus.

As to the prognosis in such a case, M. Nélaton cited one, in which he waited in order to perform an autoplastic operation, because he saw that it was becoming smaller, and he thought that the smaller the orifice the greater would be the chance of success; while he was waiting, the fistula was entirely closed without his having done anything at all. He related another case of the same kind; and also a third, where, when both he and M. Marjolin had believed it incurable even by an autoplastic operation, it had closed of itself.

The surgeon, in these cases, must not hurry too much. In the present instance, if in some weeks the fistula would not be cured, M. Nélaton said he would make use of the electrical cautery, he so often employs, in order to aid the process of reparation. This patient became very much better; while at first she could not stand up, could not make a step without all the time losing water, she improved so much that it was only when walking

about that any came into the vagina. Whe
an injection of milk showed that there wa
cation between the bladder and the vagina;
to her, by which the urine was to be drawn
and never allowed to accumulate in any qu
was to have returned before long, if not e
she was soon altogether cured.

Rupture of the Perineu

May, 1854. A young woman, who, tw
had been delivered; the head rested for s
the forceps were then applied, and there w
of the perineum. There are different vari
here, the rupture was complete; that is to
posterior commissure of the vulva, the a
anus, and the parts between. At a distance
from the skin, the end of the partition sep
the rectum was felt, and at each side was
nearly cicatrized.

This patient came for treatment at the
proper time of treating these cases has bee
say that sutures should be applied as soon
while others, among whom is M. Roux,
should wait until the puerperal condition i
tion is complete. There is a third time,
whole surface of the wound is covered with
when placed in contact, the opposite portio
each other. No surgeon, M. Nélaton said, s
went, has recommended this time, which
eighth day; for himself, he prefers it to an
the discharges from the womb are about ov
nomena resulting from the contusion of the
some patients have got well without any
together; but by keeping the parts in co
aid in the cure. M. Nélaton said he had d
in private practice; and the union held
dread of the passage of the feces, he kep
twenty-one days without a stool. When

unlock the bowels, it was with great trepidation, but the parts held together; and since that time the woman had had another delivery, and the parts did not give way. In the same year, and it is curious how such cases come together, he had a similar case, when the woman was kept for thirty days without a stool, and she was perfectly cured. Now, compare this mode of practice, so very simple, with the others usually recommended; all that must be done, is to make a few pricks with a pin, in order to hold the surfaces together.

In this instance, however, it was too late to adopt this treatment, for the parts were almost cicatrized. With the desire of producing granulating surfaces to be afterward held in contact, cantharides were applied; but they did not produce the desired effect. M. Nélaton said he would cauterize with a hot iron, and then put the granulating parts in contact. This, he said, was less dangerous than the *avivement* of the opposite surfaces, which, he said, must not be considered as free from danger; he himself knew of five cases that terminated fatally.

I do not know the result in this case, as I left Paris at this time.

Fibrous Polypus of the Uterus.

April, 1852. A woman, forty-five years of age, who had always been regular in her menses, and never had had children, or an abortion. Her health had been perfect until about six weeks before, when she felt, as she expressed it, as if the side of her fundament were asleep; after that, her abdomen enlarged, and, the symptoms continuing, she was attacked with retention of urine, for which she called a physician, who sent her to the hospital.

When she came into the wards, her abdomen was enormously distended; there existed there a tumefaction, globular, hemispherical, that extended to within an inch and a half of the umbilicus, and presented the double fluctuation, the *raising* of the fingers, and the sensation of a sudden shock, of a *wave.* This tumefaction was owing to an enormous distension of the bladder. On examining the genital organs, the finger was scarcely in the vagina, when it encountered a tumor, very hard, and evidently covered by the posterior wall of the vagina. A great deal of force was requisite to pass a finger between this tumor and the symphysis; the neck of the uterus could not be reached. In making this exploration, M. Nélaton made use of his thumb, a means of exploration he recommends to his pupils. His thumb still in the vagina, he passed a finger into the rectum, in order to appreciate better the size and direction of the mass. It was a tumor contained in the pelvic cavity, behind the posterior wall of the vagina, that descended very near to the vulva, and inclined toward the right iliac fossa. Where the uterus was, it was impossible to say; though M. Nélaton said it was very possibly situated on the upper and anterior part of the mass, which was a fibrous tumor of the uterus. There was a complete absence, however, of all preceding symptoms, and these tumors have, generally, a growth quite slow; here, it was of but two months. M. Nélaton said he had just had a case of encephaloid tumor, that had developed itself to the size of this one, in five weeks. He did not declare his opinion precisely as to the nature of the tumor; whether it was a tumor developed in the walls of the uterus, or one developed in the cellular tissue, between the rectum and the vagina. A trocar was introduced, and not a single drop of blood came, and a probe, introduced afterward, came away dry. The diagnosis was, therefore, tumor of the uterus. The patient was left alone; an operation through the posterior wall of the vagina was thought of, but she was too feeble. A peritonitis developed itself, and the patient died, a week after her entrance.

At the autopsy, an enormous tumor was found, a fibrous polypus of the uterus, developed in its posterior wall, and covered everywhere, as was easily determined, by the peculiar tissue of the uterus. The bladder was enormous.

February, 1853. A young woman, who had a very common affection, a fibrous tumor of the uterus. She was twenty-two years of age. When eighteen years of age, she had a child, and soon afterward commenced to suffer, with symptoms of the disease for which she was then in the hospital. She went to St. Louis, at which hospital M. Nélaton was then stationed, and he had then detected a tumor making part with the uterus.

At the time of her entrance, on examining the vagina, a voluminous tumor was found three or four centimetres, or about an inch and a half from the orifice; the tumor seemed to be the size of the two fists, very hard, like cartilaginous tissue; it was situated above the neck, before the anterior lip, which extended about one third of an inch below it, into the vagina. In the hypogastric region was a tumor, somewhat inclined toward the right side, hard, like that in the vagina, and movable; when movements were impressed upon it, while the finger was upon the mass in the vagina, the tumors were recognized to be one and the same. Moreover, the neck of the uterus moved in an inverse direction to the tumor, when it was moved in the hypogastric region, as if it moved on an axis.

The question was, whether this tumor was in the uterus, or only in its neighborhood; on account of this absolute relation of the movements, M. Nélaton thought it in the anterior wall of that organ; he diagnosed it to be a fibrous interstitial tumor. The wall of the uterus presents a considerable thickness, and, quite frequently, these tumors are developed there like nuclei. As they increase in size, they approach more and more the exterior or the interior surface, as the case may be; the tumor may come to have scarcely any connection with the uterus; the pedicle elongates, and at last is detached; and thus you may and do find, in the cavity of the peritoneum, fibrous tumors without any attachment. When they become thus detached, they remain without undergoing any change. Or, again, in place of going to the exterior, the tumor may go toward the interior of the uterus, and, following the same development, project into the uterine cavity, where it can be felt; the development continuing, it can happen that the tumor having come out, breaks its pedicle, as in the other case. In the present case, the tumor was supposed to be developed in the anterior wall, and to be nearer the exterior surface than the interior. The anterior lip of the mouth of the uterus, in such cases, is generally found to be effaced; here, the usual condition was not found—there was an exception.

This kind of tumors give rise to various symptoms. Some of the patients have hemorrhages, above all at the menstrual periods; and others have a notable diminution of the discharges; this poor girl *saw* scarcely anything. Some of them are painful to the touch, as was the case in the present instance; others are perfectly indolent; sometimes the pains are like those of labor. Of course, they must give rise to symptoms dependent upon the compression they exert upon the neighboring organs, as, for instance, the rectum and the urethra.

The surgeon will very often be called upon to give advice in these cases; in all of them an operation is not practicable, and he will be very much embarrassed; the best advice he can give is, *to wait.* Give a prognosis; persuade the patient that it is not a cancer, but do not hesitate to say that it will persist, perhaps get larger; but add, that *when the menses cease the tumor will diminish.* This is true; and all who have frequented the Salpêtrière (the hospital for aged females), have seen, at the *post-mortem* examinations, these fibrous bodies, that have become transformed and atrophied; they sometimes become very hard, like stones; and it is to these tumors that Louis's cases of *uterine stones* must be referred. Sometimes, however, an operation can be performed for their relief. When the tumor is in the vagina, and only attached by a pedicle to the uterus, nothing is more easy than its removal; this was done by Desault and others. Dupuytren went still further, and divided the neck of the uterus, in order to extract them. M. Amussat threw out the idea of counteracting a tendency to an exterior projection, by diminishing the resistance of the tissues internally; this was done by incising the uterine wall covering it internally. Other surgeons have gone still further, amongst whom are M. Maisonneuve and M. Nélaton himself; they have divided the neck, and, cutting down upon the tumor, have introduced the finger, and enucleated it. These operations are very serious, and are only to be performed in exceptional cases; *never*, unless you are sure that the tumor projects internally, and not externally—with reference to the walls of the uterus—unless this is the case, the peritoneum will be opened. The operation of M. Amussat is very seductive; you make a cut, and that is all; it is very simple, but, in spite of that, it is not so simple as might be believed; and, alongside of some few successful cases, are a very great number of deaths. It is found that the *shell* in which the tumor was contained decomposes, and the patients die of putrid infection.

In the present instance, some surgeons might think of performing such an operation, but M. Nélaton said he rejected it. It was better to wait, until the time when, with the disappearance of the menses, the tumor of itself would become atrophied; a time, unfortunately for the patient, very remote.

April, 1853. A German woman entered the wards, who had a fibrous polypus in the vagina, attached by a pedicle, to the interior of the uterus. The tumor was removed by excision, and everything went on very well until the end of the fourth day, when she complained of restlessness, and a tenderness in the lower part of the abdomen. A tumor was found to have formed there, in which was detected, not the *raising* of an abscess, but the *wave* of liquid effusion; this *wave* was limited to a very small extent of the abdominal walls. The general symptoms were those of peritonitis, and not of a phlegmon; moreover, the collection had formed too rapidly to be an abscess.

These cases give rise, sometimes, to very great mistakes of diagnosis; the circumscribed peritonitis can give rise to a swelling, and to symptoms imitating retention of urine. M. Nélaton has seen a number of such cases; sometimes the collection of liquid is in the recto-vaginal cul-de-sac. In one case, he related, he had supposed the collection to be purulent, rather than serous; and to show how a surgeon can lose his presence of mind at an operation, although the trocar was introduced behind the vagina, when the *interne* saw the clear liquid come out, he cried out that the bladder had been opened.

In this case, blisters were applied over the seat of the affection, as the best of all applications in serous effusions. The symptoms, however, became aggravated, the tumor displaced itself a little toward the left iliac fossa, and commenced to show signs of being something more than a mere serous effusion; a trocar was introduced, and a large quantity of pus was drawn away. The patient died.

At the examination, the liquid was found to have been effused in a portion of the peritoneal cavity, circumscribed by adherences. The uterus and vagina opened by their posterior face; the point of insertion of the polypus was shown, and its excision seen to have been as complete as possible. The operation had been as simple as possible, and yet it had given rise to fatal accidents; for it was not to be dissembled, that the excision had been the cause of death.

How such a cause produces such effects, is disputed; some maintain that it is by a violence done to the large ligaments, that gives rise to an inflammation, but this is not true, for if so, the disease would commence at once. M. Nélaton believes the inflammation of the peritoneum to be owing to the contact of a small quantity of pus, that, formed in the uterus, passes there through the Fallopian tubes; in this case, in fact, by pressing the tubes, pus was made to come out. This pus may be formed in the uterus, as said, or, what is more probable, the inflammation developed in the uterus, by continuity of tissue, travels along the tubes to the peritoneum. These are not the only cases that give rise to this opinion, for M. Nélaton has also seen the same symptoms, after injections made into the cavity of the uterus, the liquid going through the tubes. By introducing a catheter into the uterus of a dead woman, and pushing in a liquid, the water can be seen to issue from the Fallopian tubes, and the tissues of the dead body are more hard and rigid than those of the living. Again, cases occur, perfectly inexplicable unless it be acknowledged that there is a passage along the tube; as those taking place after a gentle exploration of the polypus with the finger. In one case of his own, in which death had ensued soon after an examination with the finger, the polypus was found to close completely the orifice of the neck; it was completely obstructed, so that when a liquid was formed in the uterus, it was forced to enter the Fallopian tubes.

In the uterus of this patient were found several fibrous bodies, some projecting toward the peritoneum, and one equally distant from the two surfaces.

November, 1853. A woman, forty years of age, who had always enjoyed good health. Twenty years before, she had a child; everything went off very well, and since that time she had always been regular in her menses. Two years before her entrance into the hospital, for the first time, she was attacked, without any known cause, with retention of urine. She had been all the day on horseback, and when she wished to urinate, she could not; this condition lasted twelve or fourteen hours, when she was able to pass her water. This retention of urine returned several times; three months before her entrance, she had had her fifth attack. This time she had called a physician, who found a tumor in the pelvis to be the cause of her affection.

In the anterior part of the abdomen, in the supra-pubic region, a tumor was found, ascending to very near the umbilicus, to within a finger's breadth of it, and at the sides into the iliac fossæ. This tumor was globular, but not a perfectly regular globe; some details of form were seen, upon which it is good to insist. The general form of the mass was globular, but there was a depression dividing it into two parts; one of which, the left, had five times the size of the other; there were evidently two bodies, juxtaposed. The tumor was very hard on the left side; a movable uterine tumor, touched on the abdomen, presents often a false fluctuation, for, pushed on one side, it recedes; in this case, the movement of displacement was very deceitful. The right, and smaller portion of the tumor did not feel as hard, as consistent, as the other.

On examining through the genital organs, a rounded mass was felt; the vagina was extremely oblique, it hid itself almost immediately behind the pubis; far up, the neck of the uterus was found inclined forward; its mouth was moderately open, and its tissue was as soft as natural. The uterus was felt to be continuous behind with a tumor that went off toward the rectum, and the hand being upon the abdomen, it was felt to form one and the same body; to be impressed with the same motions, as the mass felt in the supra-pubic region. Always, in doubtful cases, these two explorations should be made; raise the part in the vagina, and see if the other is raised, but that is not sufficient, unless the second be executed; by the hand on the abdomen, impress a lateral movement, which is appreciated by the hand in the vagina; when the movement is in the inverse direction, there can be no doubt as to the nature of the case.

The conclusion from the examination was, that there existed a uterine tumor. These are almost always fibrous, and unless there are contradictory symptoms, they should be supposed to be such. Here the tumor was thought to be developed in the posterior wall, and on one side; the smaller and softer portion of the tumor was supposed to be the uterus itself.

This case was curious, on account of the symptoms; the rule is, that the patients have hemorrhages, and present themselves for advice, on that account; in this case there was no hemorrhage: such cases are occasionally met with, but they are exceptional. Sometimes the patients come to the last stages of anemia. These hemorrhages cease at the epoch of life when the menses cease; a kind of senile atrophy of the tumor then takes place, and at last what were formerly called *uterine stones* are found. Another symptom of these tumors is retention of urine. It can very readily be understood, that a tumor developed in the pelvis can produce retention, yet for that it must have either considerable volume, or certain relations with the urinary passages. In this case, the tumor was very movable; it had ascended out of the cavity of the pelvis, and it was developed in the posterior wall of the uterus. It was difficult to give an explanation of the existence of the symptom in this case, but it was thought to be owing to the ascension of the uterine system; the intimate relations of these organs, and those of urination, are well known, and it was believed that the bas-fond and neck of the bladder having been carried up, an *elbow* had been formed in the urethra, at the aponeurotic orifice through which it passes. If this were the case, whenever the symptom arose, the course to be pursued would be to force the tumor to descend, which could easily be done, for it was very movable.

M. Nélaton said he had recently had occasion to see a patient with a fibrous tumor of the uterus, declaring itself by absolute, complete retention of the fecal matters. The tumor flattening out the rectum, it was essayed to introduce bougies, but none could ever be passed. All the symptoms usually resulting from such an arrest took place, and were carried to such a point that the patient had stercoraceous vomiting. At last the idea of making an artificial anus, after being talked about at the consultation of physicians, came to the ears of the family, and in answer to their demands, as to what would happen unless it were done, it had to be said that the patient would, of necessity, die. The family insisted upon having the operation performed, and his hands thus forced, M. Nélaton opened the abdominal walls, in the left iliac fossa, and a knuckle of intestine presenting itself, it was stitched to the walls, and opened. The fecal matters came away through this artificial anus, and the patient was greatly relieved. Without any signs of inflammation, however, the patient sank, and died at the end of eight days.

The most usual symptom, then, of fibrous polypus of the uterus is hemorrhage; the next, is retention of urine; the next, retention of the feces; and, fourthly, there is sometimes peritonitis.

M. Nélaton did not think any operation was to be attempted in this instance, and the patient left the hospital.

The following case is recorded here, with those of fibrous tumors of the uterus, on account of the facility of confounding the two affections.

November, 1852. A young woman entered the wards, who had been confined fifteen months before. Having uneasy sensations in the pelvis, she had been examined about three weeks previously to her entrance, and was told that she had prolapsus of the uterus.

By the finger in the vagina, the neck of the uterus was felt to be of its normal size, and in its normal position; it was when the body of the uterus was attempted to be explored, that the doubts commenced. Very hard projections were felt, commencing in front of the uterus, and continuing along the right side; when the neck of the uterus was sustained, and the tumor moved through the abdominal walls, the uterus was felt to remain unmoved; the tumor moved independently of it. An examination was made through the rectum, for which purpose chloroform was given, for it is always painful; the thumb was introduced into the vagina, and the two first fingers into the rectum. On a level with the sacro-iliac symphysis of the right side, a tumor was discovered to exist, totally independent of the uterus. In regard to its nature, it evidently was not liquid, and therefore not a tumor formed by a purulent collection; the tissue was fibro-cartilaginous; and it was diagnosed to be a fibrous tumor arising from the posterior portion of the pelvis, particularly from the sacro-iliac symphysis, sending prolongations into the pelvis, and, moreover, above the upper strait. These tumors quite often spring from the sacro-iliac symphysis. In M. Gerdy's thesis on polypi, a case of this kind is related, which was mistaken for a polypus of the uterus, and being treated as such, death followed the attempt made to remove it.

Of course, no operation can be thought of in these cases. The patient did not remain in the wards.

Fibrous or fibroid tumors of the uterus are often cited as types of fibrous tumors in general; from the researches of Lebert,[1] however, it can be affirmed, as had been suspected by other observers, that these tumors are formed by the production of a new substance, that offers the most perfect analogy of intimate structure with the normal uterine tissue. There is homologous production of the tissue of the organ, mixed with elements of fibrous and fibro-plastic tissue, rather than production of a true new tissue, foreign to the physiological elements of the womb.

Microscopical examination of these tumors, made before they have undergone too great changes, shows two sorts of elements; one, fibrous and fibro-plastic, serving to bind together, so to speak, the bundles of muscular fibres; the other is composed principally of these muscular fibres themselves. This tissue, in appearance striated and fibrous, shows itself most manifestly to be composed of muscular fibres of organic life. By treating the preparation with acetic acid, the nuclei show themselves so plainly characterized that it is impossible to mistake them for any other histological element.

True fibrous tissue is formed of the same elements as the cellular tissue; that is to say, of long, flat, thin, smooth, slightly elastic filaments; but in fibrous tissue these filaments are reunited in compact fasciculi, visible to the naked eye, strongly adherent to each other, and crossed together in every direction. A tissue formed of fibres like those of the natural fibrous tissue is sometimes formed in the economy, in consequence of a morbific condition; sometimes presenting itself under the form of membrane, and sometimes under that of a fibrous body, or fibrous tumor.

These fibrous tumors are rounded masses, of greater or less size, hard, generally white or yellow, and but slightly adherent to the parts around them. Those soft, red, fleshy tumors, called also fibrous, are in reality composed of fibro-plastic elements.

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[1] See Comptes Rendus of the Society of Biology, for 1852, page 68.

Retro-uterine Hæmatocele.

November, 1851. A middle-aged woman, who said that, four years before, she had been very seriously sick, and on her recovery had perceived a tumor develop itself in the right side of the abdomen. From the position she indicated, this tumor had been situated four or five centimetres, or about two inches, above the Fallopian ligament; it was always painful; whether it had been movable or fixed could not be ascertained with certainty. This tumor, the woman said, had disappeared gradually under the influence of magnetism.

About two months before coming to the hospital, her menses were retarded for five days, after which time, they burst forth suddenly, and after they were over she continued to have acute pains in the lower part of the abdomen.

On examination, a tumor was found in the cavity of the pelvis; it could be felt through the posterior wall of the vagina, below the neck of the uterus; it seemed to be about the size of a goose-egg. M. Nélaton believed this to be a *bloody tumor*, an *hæmatocele;* they are always behind the uterus, always *retro-uterine.*

The history of these bloody tumors is quite recent, and several cases were related to show that they positively do exist, that there are positive indications of these tumors. The first patient he had, he said, he sent away as incurable, believing that it was an encephaloid cancer. Over the second patient he reflected a long time; and concluded at last to introduce a trocar; if cancer, the puncture could do no harm; and, moreover, he had an idea that it might prove to be an abscess. After the puncture, about one wineglassful and a half of blood escaped, and the patient recovered. About the same time, M. Malgaigne, believing that he had a fibrous tumor of the uterus to deal with, laid open the hæmatocele; his patient died of putrid infection. These cases were communicated to the Society of Surgery, and the attention of the profession being thus called to the affection, in the space of one year the reports of twelve cases were communicated.

This affection is ordinarly marked by trouble in the menstruation; the menstruation is affected by it in very different ways; that is all that can be truly stated about it. There is a sensation of pressure towards the rectum, and, generally, a very marked, very pronounced constipation. The urination is not so easy as before. The tumor itself is rounded and quite firm; and the uterus is ordinarily pushed forward, and placed very high in the pelvis. Through the abdominal walls, one or several tumors are found, small or large, single or agglomerated, occupying the highest portion of the pelvic cavity; on one occasion, M. Nélaton saw the principal tumor elevate itself as high as the umbilicus. By the touch, these tumors in this position are easily determined to form one with that behind the vagina.

The general symptoms of the affection are depression; fever, not intense, but a febrile movement, the pulse being eighty or eighty-five; most generally abdominal pains; and, very often, vomitings, which are sometimes most excessive.

If these tumors are opened, sometimes as much as a quart, or a quart and a half of blood will issue; all of the blood is not liquid, some is coagulated. They can open of themselves in different directions, of which M. Nélaton had seen two cases; one into the rectum, the other into the rectum and the vagina. Another very important termination is the absorption of the blood; another, is the opening of the tumor by art.

This tumor is constituted by an effusion of blood, into the peritoneum between the vagina and the rectum; the cul-de-sac there situated is the limit of the tumor below; above, it has no limit but the intestines, which are pushed up.

In order to account for the existence of such a tumor, it must be considered, first, that it is peculiar to females; were it but a simple peritonitis, men also would be affected. In one case, and the fact is exceedingly important, in which an autopsy was made, the ovary was found projecting in the tumor, with small bleeding points. At the menstrual period, there is a congestion of blood, a determination towards the ovaries; there is a vesicle tending to separate itself. Supposing this blood to be effused into the peritoneum, and plastic lymph thrown around it, you have the tumor. The broad ligament is divided between the bladder and the uterus, and again between the uterus and the rectum; the ovary is in the posterior portion, and there is where the blood is effused.

After a certain period, the acute period of the affection passes away. The absorption of the blood can be hoped for, and there is nothing better to do than to wait for a certain time. The surgeon should always wait, unless the symptoms are pressing. The puncture of the tumor is sometimes frightful, the fluid portion comes away, but the solid remains and decomposes; if it is opened, then, it should be done largely. Extra-uterine pregnancy has the same symptoms as this affection; but it is excessively rare, and has a different progress.

The patient remained in the wards, and every eight days the changes accomplished in the tumor were examined; the diminution was gradual, but by the middle of January was already quite considerable. When the patient left, some months afterward, there was not the slightest trace remaining of her affection.

December, 1853. A young woman, who had become pregnant fourteen months before her entrance, but aborted without any known cause, at the fifth month. Everything went off very well; she said that, since then, she had suffered from headache; but she mentioned no symptom having anything to do with the affection at present under consideration. She had been for some time very irregular in her menstruation, both as regards time and quantity; for the last four months she had seen nothing, and entered the hospital on account of suffering a great deal at the genital organs.

The fingers in the vagina encountered the neck of the uterus not very far from the vulva, and carried forwards; it was small, as in women who have had no children, with a small orifice, and flattened antero-posteriorly. Almost directly behind it was a mass, and as the posterior wall of the vagina is soft and flexible, you could, by pressing, appreciate the projection of the tumor. In the hypogastric region was a mass, in which was a depression, like the top of the heart of playing-cards; when movements were given to the tumor in the vagina, they were communicated to the right portion of the tumor, and not to the left. This tumor was evidently not uterine, but was placed against and behind the uterus. It was either a retro-uterine hæmatocele, or a phlegmon of the ovary; it was not an extra-uterine pregnancy, for in such cases the uterus undergoes changes. The consistence of the mass was *pasty*, not evidently fluctuating; it had been rapidly developed, and was regular in form; it was placed behind the uterus, and that organ had its neck thrown forward behind the symphysis; M. Nélaton, therefore, decided it to be a hæmatocele. Moreover, the tumor was observed in a young woman who had trouble in menstruating; and, again, there was one more symptom of its being a bloody tumor—there was a bluish tint, a bluish transparency of the vagina covering it; its thin wall permitted the color of the blood to be seen behind it. There was a small irregularity in the position, in this case, that has been observed before, namely, that above, it was not placed behind the uterus, but at the side of it.

These tumors must be quite common. Four years before, a furthest, one of M. Nélaton's *internes* published some cases, and soon afterward, all of the surgeons in the Parisian hospitals reported others. There is something strange in the affection; it i never found in the dissecting-rooms. This is owing, however, t the fact, that the affection is but an effusion of blood, and it i gradually absorbed. He referred to the case that had been i the wards some months before, when the affection had been supposed to be an ovarian tumor fallen into the cavity of the pelvis not thinking this diagnosis to be correct, the patient had been kept in the wards, and at the end of several months there was not a trace of the tumor. This, the absorption of the blood, is one of the modes of termination, and the most happy; at other times the rectum is perforated; at others, the vagina. These othe terminations are sometimes fortunate also; yet they have thei dangers, for putrid decomposition has been seen to occur, an some of the patients have died. M. Nélaton has seen one suc case in the wards of M. Marotte, and another in those of M. Moreau On this account, therefore, the danger of putrid infection, M Nélaton, now-a-days, takes good care not to open the sac; not fro what he had seen in his own practice, for all had recovered, bu from what he has witnessed in that of others. The openin should never be made; you can always rely upon the absorptio of the mass.

This patient remained in the wards until the end of January gradually getting better; she then left the hospital; as the cur would be as well completed at home.

March, 1854. A young woman entered the wards, who sai that, four or five months previously, she had commenced to lose blood in her urine; this hæmaturia, after having lasted for some time, had ceased, and it had been replaced by a loss of blood from the uterus. This uterine hemorrhage was still continuing when she came into the wards.

Upon examination above the pubis, a pelvic tumor was found, placed behind the uterus, towards the left side. The finger being introduced into the vagina, the tumor could be moved, and felt to be distinct from the uterus; its consistence was peculiar—it was like paste. The neck of the uterus in this patient was directed backward, which is an exception to the general rule in these cases; the cause of it was not known. Just behind the neck, the lower part of a globular mass was distinctly to be felt. M. Nélaton was of opinion that this was one of those *bloody tumors*, and that the proper mode of treatment was temporization.

M. Nélaton said that, now, his *education was made* as regards these tumors. The first case he had seen, he had sent away as incurable; the second case (it came the same week as the other) he thought about a long time, and at last determined to introduce a trocar; it was either an encephaloid mass, a cyst, or an abscess; if the first, the puncture could do no harm, for the patient must die; and if a cyst or an abscess, it would be emptied. Very much to his astonishment, the introduction of the trocar gave rise to a discharge of a pint of liquid, of the color of molasses. Another case came into his hand soon afterward; a woman who had hemorrhage, and a large tumor having the same position; a trocar was introduced, and the opening afterward enlarged; two pints of liquid, black and with dark clots, came out. Formidable symptoms followed this opening: the sac inflamed, and the patient's situation was very critical for some time; but she eventually recovered.

Just at this time, a patient went to M. Malgaigne; he thought it an interstitial fibrous tumor of the uterus. At that time, it was the practice to make incisions and extract these polypi; he, therefore, cut right and left; but when the limits of the neck of the uterus were passed, to his great astonishment, he entered a large sac of blood. This patient died in four days; at the autopsy, the ovary was found projecting, with bleeding points, into the sac. Soon after this case, another came to M. Nélaton, was forced to keep her bed; her foot would scarcely touch the ground before it would recommence. At last even rest in bed ceased to exert its influence, and she lost blood all the time. She was very white, the lower extremities were œdematous; she had pain on the top of her head, palpitations of the heart, *souffle* in the vessels, in short, all the signs accompanying great anemia.

Upon examination, both by the touch and by the speculum, the uterus was found to be perfectly healthy; even in the neck there was nothing abnormal found. There was, however, blood constantly exuding from the orifice. This being the case, M. Nélaton said he believed in the existence of *fungosities* of the lining membrane of the cavity of the uterus, at least of what are called fungosities, for they are, in reality, but parts of the internal mucous membrane itself. He begged the class not to pre-occupy themselves with the meaning of these words; what they mean is that there are certain women who lose blood, and have a certain condition of the uterus. These he would remove by means of the curette, the instrument employed by Récamier, who first introduced this operation. To do so, the speculum is first passed, and when the neck is seen, the curette is engaged in the opening; the instrument passes easily for two centimetres, when it is generally arrested by the second neck. Here it is necessary to make some *tâtonnements* (gropings) that are rather painful; but at last the second neck is found, the instrument is pushed, and it penetrates nearly two inches more. The curette is turned round so as to scrape the interior wall of the uterus, and when it is withdrawn, the cavity of the instrument contains false membranes, a highly vascular substance, like the granulations of a healing wound. The speculum used to facilitate the introduction of the curette is the two-bladed; for after the curette has been introduced, the speculum can be withdrawn by its lateral opening, and the curette can then be turned in any direction you may desire. The day of the operation there is a slight discharge and some pain, but the next day the relief is most remarkable. In some cases, when the discharge had lasted many years, he has seen it arrested almost immediately. The surgeon is surprised by the immense result produced by the extraction of these small flakes. When there is a commencement of retroflexion, if the operator is not aware of it, the introduction of the curette will present insurmountable difficulties; in place of turning the concavity of the instrument forward, it must be presented backward, after having reached the internal neck.

M. Nélaton said he had never seen any bad symptoms follow this operation in his own practice, but in that of M. Récamier a patient had died of peritonitis, in twenty-four hours. At the autopsy of this patient, the Fallopian tubes were found very large, very much dilated, and their fimbriated extremity obliterated. The tubes contained pus, and a small orifice was found in one of them, that communicated with the peritoneum. The death of that patient ought not to be attributed to the operation. The patient had been suffering for a long time, and, most probably, the condition of the tubes had previously existed; most certainly their dilatation was not from recent disease. Things like this should not interfere with a surgeon's practice: *when an operation has been performed an infinite number of times without any bad result, one fatal case should not be viewed in the light of cause and effect.*

M. Nélaton said he could affirm that the members of his class would meet with many cases of this kind; young women, in whom the menstrual discharge is regular for six or eight days, when it gives place to a rosy discharge, half serum, half blood, and in whom there is no ulceration of the neck. This disease is very often seen, and chiefly in women under thirty-five years of age. The operation spoken of was performed. The neck of the uterus being exposed by the introduction of the speculum, the curette was introduced, which, as usual, was arrested for some time at the second neck. The instrument was twice introduced, and a soft membrane brought away. The patient suffered but moderately. In order to complete the operation, M. Nélaton said it would be necessary to cauterize the internal surface of the uterus; it is not a painful operation; a serous, and afterward, a purulent discharge follows, and at last the patient is cured.

No bad symptom followed this scraping of the inside of the uterus, and eight days afterward it was cauterized by means of the instrument of Lallemand. Almost all the caustic in the curette, or about eight grains, was allowed to be melted, for the uterus can support a very energetic cauterization. This is one of the most simple of operations, so far as its effects are concerned; M. Nélaton had never seen the smallest accident result from it.

Nothing more was done for this patient, and in the month of July she left the wards, perfectly well and able to work. Her uterus was then in a condition perfectly physiological, that is to say, she had her menses every month, and they lasted four or five days. The whole train of symptoms with which she had been suffering for years, left her; and she then perceived, what she had not before remarked, that, during the advanced stage of the disease, she had lost her memory.

In July, 1853, this patient returned, warned that her affection was recommencing, by the reappearance of the discharge of rosy-colored serum after the menses.

M. Nélaton said he would introduce the curette, and extract the fungosities, which he expected to find. The surgeon might be tempted, from the small amount of tissue brought away by this operation, to think that it had nothing whatever to do with the cure; but M. Nélaton said he had seen too many such cases, to have any doubts about it. Many women are seen with hemorrhages, and also pains in the groin, and in the back, who, treated in every variety of manner, have received no benefit, but the curette introduced, they are better at once. What shows, moreover, the cause of their suffering, is the fact that, when the curette is scraping the interior of the uterus, the woman complains of the surgeon's hurting her in the usual seat of her pains. The operation has been done thousands of times, and in one case only did any bad consequences follow, and it was very doubtful in that case (the one above related) whether the operation was the cause of death; the death had been caused by the rupture of an abscess in the Fallopian tube, which rupture had coincided with the operation.

It is not entirely by symptoms that the existence of this disease is determined, that is to say, it has no pathognomonic symptom, distinguishing it from any others; there are symptoms of uterine disorder, it is true, and suppose you search and find no explanation of the symptoms observed, then you determine the existence of this affection; you do it, therefore, rather *by exclusion.* M. Nélaton said he knew of no example of the affection, without the woman had been pregnant—without there having been a childbirth, or an abortion. It is rarely observed after thirty-five years of age, unless it had commenced before, and it generally begins in the first period of adult life.

As regards the signs accompanying the affection, there are uterine discharges, showing themselves in the following way: The patient at first perceives that her menstrual period advances, and continually so, until sometimes they have two periods in a month; the blood lost at one time is not very great, but the discharge lasts a very long time, and, what is a very valuable symptom, the menses do not cease at once, frankly, so to speak, but the discharge continues, at first reddish, and afterward white, not like the white of an egg, but more aqueous. The tissues of the neck are entirely healthy, but it is slightly augmented in size, and its orifice is generally a little enlarged. In fine, in some cases, the diagnosis is certain, for the fungosities are in such quantities that a small, red, fungous mass projects from the orifice of the neck of the uterus; and by means of a curette they can be extracted in considerable quantities. These masses may be sufficiently large to resemble an encephaloïd mass, and, in fact, M. Nélaton thought them so the first time he met with them, but it was not encephaloid, for their ablation, and the cauterization of the uterine cavity, brought about a cure, which, at that time, had been maintained for more than five years. There are certain points at which vague pains are felt in this affection: in the sacral region, what patients generally call the loins, in the abdomen, and generally at the termination of the round ligament. Independently of these pains, they are generally troubled in walking. When a patient is met with having these symptoms, the surgeon can diagnose, with great probablity, fungosities of the uterus. After granulations, and ulcerations of the neck of the uterus, it is the most common affection of that organ.

In the treatment of the affection, the curette should be introduced two or three times, so as to bring away all the fungosities, and then the interior of the uterus cauterized with nitrate of silver, by means of an instrument like that of Lallemand, only larger. The disease, it should be known, has a tendency to return; at the expiration of five or six months the patients often come back; but they know what they are to do, and the surgeon can at once be called.

Abandoned to itself, it is infinitely probable that the disease cures itself; for ever since Récamier called attention to it, it is constantly being found, and we find no observation of it before his time. Its pathological anatomy is difficult to study; yet M. Nélaton has found some bodies thus affected in the epidemics of cholera. In such cases, upon making inquiries, he found that the women had presented the symptoms above described.

After the introduction of the curette and the abrasion of the internal surface of the uterus, this patient suffered a little in the hypogastric region, but not so much as to require any calming remedies. The same day she lost some blood, but forty-eight hours after, there was no more discharge. Six days afterward, the interior of the uterus was cauterized, ten grains of nitrate of silver being allowed to melt within the cavity. In the course of two weeks, the patient left the hospital as cured.

July, 1852. A woman, twenty eight years of age; she had had two children. After the birth of her first child, she commenced to suffer in the hypogastric region; the pain was excessive, above all, when in the vertical position; the menstruation was normal in every respect. She consulted a physician, who, finding the uterus completely normal, and embarrassed as to what advice to give, told her that she must become pregnant, and that all would leave her. This advice was followed; but after delivery the same thing took place.

When she entered the wards, the pains were so excessive that she had tears in her eyes when she spoke of them. All the means habitually employed against neuralgic pains had been employed without success. M. Nélaton introduced the curette, and brought away a very small quantity of fungosities. The pains following this operation generally are over in three or four hours, but in this case they lasted for two days; they were even greater than before. These pains gradually diminished, and the patient had very much improved, when in August the summer vacation commenced.

January, 1853. M. Nélaton said he was about to perform an operation of extreme simplicity, rejected by some surgeons, and adopted by others. The patient was a woman, about thirty-five years of age, and having the appearance of health; she had had many children. After one of her deliveries, she commenced to suffer in the right groin; and walking began to be very painful to her. A physician examined her, and found something at the uterus for which he cauterized her; that was all she could tell about it. Not being benefited, she went into the wards of M. Denonvilliers, who, finding the case to present many difficulties, consulted M. Nélaton about it. At that time, she had been suffering for four years; nothing had given her any relief; she was forced to remain all the time in bed, and yet she had the appearance of perfect health. A curette was introduced, and a quantity of fungosities were extracted from the cavity of the uterus. The substance called fungosities is soft, of a rosy color; in some points are small clots of blood, in others are small vessels; and it is easy to see that it is organized like the surface of a granulating wound. To his great astonishment, the patient was greatly relieved by this operation; it was repeated at the expiration of four days, and again a third, and a fourth time. The patient, in a short time, was completely cured, and left the hospital. She had, however, become pregnant again, and at the birth of her child she found herself again laboring under the same affection, after having been perfectly well for four years.

In this case, the menses were normal; they were not followed, as they generally are in such cases, by a liquid discharge, slightly tinged with blood; the symptoms were those she had had four years before.

The reason why some surgeons reject this operation, why it does not enter into ordinary practice, is because sometimes the fungosities are so small in quantity that it is not believed that their extraction can afford such great relief. Whatever may be the theory, however, as to the action of the curette, one thing is certain, observation shows that the patients get well after its use.

This patient was cured of her symptoms, as she had been before, by the extraction of the fungosities.

February, 1853. A woman, forty-seven years of age, who had the appearance of one who had long been a sufferer. She entered the wards, a physician having told her that she had a cancer of the uterus. When twenty years of age, she had had a child, but her health and strength had been perfectly re-established after the delivery. Fourteen months before her entrance, she had a veritable uterine hemorrhage; large clots of blood came away, and there had been several attacks of syncope. Ever since that time, she had not ceased to lose blood, which sometimes was in clots. When she entered the wards, the odor of this discharge was very fetid; the complexion of the patient was yellow; and she complained very much of pains in the sacral region, or what women generally call the loins. By examination in the vagina, the neck of the womb was found to be perfectly healthy.

Was this a case of cancer of the cavity, which is not so rare as has been said? and M. Nélaton had seen many cases in which the neck remained intact; or was there a polypus? or, thirdly, were there fungosities? If there was a polypus, it must occupy some space, but, in determining the volume of the uterus, it did not seem to occupy more place than a healthy organ. The neck of the womb was not in the least open, and, besides, in cases where polypi exist, it is generally shorter than natural, and, during the hemorrhage, the finger can be introduced so as to touch the mass. Moreover, the absence of these symptoms could not be attributed to smallness in the size of the polypus, for there would be too great a disproportion with the symptoms. The diagnosis from cancer of the cavity was more difficult, and M. Nélaton said we did not possess a sufficient knowledge of the symptoms of such cases. Sometimes, in cases of cancer, he had seen bubbles of gas escape from the orifice of the neck, when the hypogastric region was pressed upon. In order to see this, it is necessary to introduce a speculum, and watch the orifice while the pressure is being made. It is not astonishing that this should be so, for when a cancer is developed, sanies and gas form in the cavity. As a general rule, a cancer increases the size of the uterus, and *in making a diagnosis, the usual symptoms must be taken.* Moreover, the pains in this case were not excessive, and, in some cases of cancer, M. Nélaton had seen them to be terribly severe.

The curette was introduced into the cavity of the uterus, and a quantity of substance resembling encephaloid tissue was brought away; it was, however, fungosities, and between these tissues there is no comparison to be established. Whilst the abrasion was being made, there was a sensation as if the internal membrane of the uterus was formed of shagreen. This sensation, according to M. Récamier, is the indication to the surgeon of the time when the operation should cease; it must be continued until there is no more of it. After the operation, the patient suffered but very little; she had pains for about an hour, and then she felt much better. After this first introduction, the discharge lost its fetidity, and the pains in the sacral region notably diminished. In the course of two months, this woman left the wards cured.

December, 1853. A woman entered the wards, who had been in M. Nélaton's care in 1849, at St. Louis, for uterine hemorrhages, that had lasted for two years. She said that her menses would last for seven or eight days, and when they were over, a true hemorrhage would come, lasting for four or five. The patient recognized the true menstrual discharge by the blood being black, and not coagulating; the discharges afterward were more red, and coagulated. She had got worse, gradually and continually, until the time of her entrance into the hospital in 1849; at that time she had been losing blood, without intermission for two months. M. Dubois had been called in to see this patient; he was not certain in his diagnosis, but there was so much engorgement of the uterus, he thought there must be a tumor there. M. Nélaton, however, thought the engorgement to be owing to fungosities, which are, perhaps, only swelling of the internal mucous membrane. The curette was introduced, and a quantity of fungosities were brought away; this, the patient said, was done but once, and some days afterward, about eight grains of nitrate of silver were allowed to melt in the uterine cavity. This cauterization of the uterus M. Nélaton has never seen attended with any bad effect; and M. Cazeaux has told him that he considered it an operation totally exempt from danger. This patient, after the operation, complained of pains in the loins, meaning the sacral region; the extremity of the round ligament, at the level of the external ring, is another general seat of pain; in this case it was not there, but about an inch above the crural canal. For these pains, local applications were made; the chlorohydrate of morphia on blistered surfaces. The hemorrhages were greatly diminished by this treatment, and the patient thought herself so entirely cured, that she went out; she soon afterward became pregnant, had an abortion at the sixth month, and since then had the same affection, and entered the wards in the state in which she had been when she had gone to St. Louis.

This patient was benefited as before, by the extraction of fungosities from the interior of the uterus, and when she left she was again cured, or, at least, was freed of the symptoms for which she entered the hospital.

In a memoir upon the anatomy and pathology of the uterine mucous membrane, in the xvii. volume of the *Archives Générales de Médecine*, M. Robin thus treats the affection, of which the preceding cases are reported.

"These granulations have their seat on the lips of the neck, in its cavity, and ascend even into that of the body; they form small projecting tumors, of the size of a canary-seed, of a pea, or even a little larger; they have a fleshy consistence projecting from the surface of the mucous membrane, and sufficiently friable to be detached by the finger nail. As is well known, it is this last characteristic that has led M. Récamier to remove them by scraping the surface of the cavity of the neck, or of the body of the uterus, with a curette appropriated to that purpose.

"These granulations, in an anatomical point of view, have the same fundamental structure as the uterine mucous membrane; they are simple excrescences of this membrane; they are formed of cellular tissue in small quantity, and of fibro-plastic elements, more abundant even than in the tissue of the mucous membrane, taken in its natural state. Some, among the smallest, are covered by a layer of epithelium, like that of the uterus. The greater part, moreover, have quite a large number of capillary vessels ramifying throughout them."

Cancer of the Uterus.

May, 1852. A woman, about fifty years of age, entered the wards for cancer of the uterus. It was impossible to recognize the neck of the uterus; the part was filled by masses of a softish tissue, juxtaposed to each other, and between which the finger could be passed. This tissue resembled such, M. Nélaton said, he thought it to be; sometimes he had been deceived. He ha one, and after diagnosing cancer, he ha prised, after the lapse of several years, enjoying good health. Such tumors, las bleeding, and destroying the parts aroun

With polypus forceps the vagina w masses of soft tissue, and afterward the a hot iron. The woman did not remain

February, 1853. M. Nélaton called att had an affection, very common, and one i deal more should be known. The patie of age, and until six months before, ha health. Two years before her entrance eighteen months afterward, without an had a return of discharges from the ute rhage can come from cancer, from polyp Now it is very probable that in these di rhage does not present exactly the same s there may, perhaps, be a difference as to direction, M. Nélaton said, that physician *precise the symptomatology.*" In this case health, not suffering in the least, when s to lose blood—in quantity but very littl usually seen; and in quality rosy. Af charged clots of blood for three or four d lief, and after some time a serous discharg serosity did not have the peculiar odo surgeon to declare the affection cancero this odor does not show itself before th When the ulceration comes, the odor co ever, the smell comes before the ulceratio where these symptoms exist, and where nothing; by the touch, the neck is found too dense. In the present instance the nec ed; it was ulcerated, and the finger cou pieces of the cancerous tissue pulled away plain of pains in what they call the loins; but on making them point out their seat more precisely, it is found to be at the sacrum. Almost all these patients complain of insomnia.

In the treatment of these cases by cauterization with the hot iron, the patients are freed of their hemorrhages for a long time. Injections are rarely useful. For the pains, they are sometimes much relieved by the introduction, by means of forceps, into the cavity of the uterus, of a capsule containing a solution of morphia. What is very strange, in some instances these pains suddenly stop of themselves. These cases are often the *pasture* of charlatans.

December, 1853. A woman, who had formerly been under M. Nélaton's care, at St. Louis, came into the wards with a fungous mass, bleeding very much, in front of the uterus. From the appearance of the mass, the surgeon would be very much inclined to think it a cancer; yet from the cases he had seen, M. Nélaton said he was disposed to believe it to be not truly cancerous. When he had seen her before, he had applied the actual cautery, hoping to destroy the whole; but after several trials, and seeing the disease to progress more rapidly that the scars fell, he had cut away the most of it, and then applied Vienna paste, to destroy what extended beyond the neck. She left the hospital in 1849, and so well that she got married. She continued well until six weeks before her entrance, when she again experienced symptoms of her old affection. Upon examination, the neck of the uterus was seen to be deformed; the anterior lip was wanting to some extent, and it was smaller than the posterior. This posterior lip was not smooth on its surface, and there was a small projection, resembling a nipple, that, the speculum being introduced, was seen to bleed at the slightest touch.

The surgeon should be very careful how, in cases like this, he diagnoses cancer—above all, in young persons. Induration is the only difference between the true cancerous tissue and that resembling it; and M. Nélaton said that the only distinctive sign for him was, the hardness in the one case, and the softness in the other. In this case, there was enough to make the surgeon declare it could not be cancer. What was it, then? In this instance, the micrographs have furnished the science with some useful notions, by showing these tumors to be only hypertrophies of the normal constituents of the neck of the uterus, of its glandular parts.

For the treatment of these cases, the actual cautery is the best application; but it cannot be applied in every case. Sometimes excision can be performed, and sometimes the disease can be removed by ligature. When *all* the diseased tissue is removed, the cure is a permanent one.

In this case, M. Nélaton cauterized with a hot iron; and when the patient left, he said he could hope that she would be without any more symptoms of her affection—at least for four, five, or six years.

Inversion of the Uterus.

June, 1852. A young woman, who had already been delivered of three children, the third time with some difficulties; at the sixth month there had been a hemorrhage, and another at the eighth, followed by the birth of the child. She said herself that the placenta was attached at the neck of the uterus; it was torn loose, and the hand passed into the uterus, and version made to bring the child down by the feet. She did not get along well after this confinement; about the sixth day she lost blood very abundantly, and again on the eleventh. Examining herself in the vagina, she found a body presenting itself. She consulted a physician as to her condition, and he advised her to remain in bed at least two months; she went to bed, but got up again in three weeks. After moving about a few weeks, in a very miserable condition, she came to the hospital. After making a most attentive examination of this patient, M. Nélaton said he did not fear to say that he did not know what was the matter with her. In the vagina, not far from the vulva, was a tumor, quite firm, and which also to the touch seemed to contain a cavity in its interior. Just above the pubis a hard body could be felt, which appeared to be the fundus of the uterus. The tumor in the vagina and the body above the pubis were moved by the same impression.

At first, this tumor in the vagina was supposed by M. Nélaton to be formed by an inverted uterus; the sixth day after confinement, hemorrhage, and the finding the tumor the eleventh, rendered it very probable; but he was soon forced to renounce that idea by finding the fundus of the uterus behind the pubis. It is well to know, however, that the uterus may become inverted *some time after* delivery, and even that it can take place when the organ is perfectly empty.

A displacement of the bladder generally leads to a difficulty of urinating, and perhaps the bladder was distended; but the touch showed the tumor to be harder than a distended bladder, and, moreover, a catheter passed into the urethra showed the bladder to be empty. In order to make sure as to the uterus being in its position, it was tried to touch the catheter in the bladder, by the finger passed up the rectum, but it was not to be effected. An inverted uterus is not increased in size, or but slightly so; here the tumor was enormous.

This affection, M. Nélaton said, was either an obliteration of the mouth of the uterus, and an accumulation of liquid in the cavity, or it was a tumor developed in the walls of the uterus. Obliteration of the mouth of the womb is very rarely seen, almost never; and again, how could it be a tumor of the uterus without there having been any symptoms before the sixth month of pregnancy.

The only thing of which he was perfectly sure was this, that there was *not* inversion.

Anteflexion of the Uterus.

November, 1851. A young woman, apparently in very good health, entered the wards for an affection of the uterus. She had always been very well, until two years and a half before, when she was married, and soon after that time her affection commenced. During the whole of the time her menstruation was regular; there was no leucorrhœal discharge, nor had she become pregnant; but she complained of pain, as the seat of which she indicated the left groin, and just where the round ligament passes in the inguinal canal; there was also a painful spot in the centre of the crest of the left ilium; and she had pains in the lower part of the loins. These pains were scarcely felt when the patient was in bed. There were also, at times, pains on the right side.

Defecation was regular, but the woman had to pass her urine very often.

By the touch, the neck of the uterus was found at its normal height, situated as it should be, in its normal direction, and of normal volume; there was absolutely nothing wrong to be found about it. By pushing further the exploration, it was found that before the neck, and a little higher than it, was a tumor, separated from the neck by a groove, terminated by a cul-de-sac. Between th neck and the tumor, there was continuity of tissue, and they bot were affected by the same movements. The tumor was the bod of the uterus, turned forward, and inclined toward the righ side. M. Velpeau is the first who brought the knowledge of thes deflections before the profession. As a general rule, these p tients are sterile, for the neck being bent upon itself, its cavity i effaced, and the seminal liquid cannot pass. If fecundatio should take place, abortion is very common.

In retroversions of the uterus, the ordinary pessaries, abov all, those *en bilboquet*, can be used; for some days they cause pai and a discharge from the vagina may take place, but these effec soon pass away. In the majority of cases, the instrument ca be removed in a few months, and the uterus remains in its normal position. M. Nélaton does not at all like the cauterizatio of the neck of the uterus and of the neighboring portion of th vagina, to bring about their adhesion, and thus bring the ut rus to its normal position.

But an ordinary pessary can have no effect in a case of ant flexion, like the one under consideration. Simpson's sound, o something of that kind, must be used; an instrument, to bring to its position, and to keep it there, must be introduced into th cavity of the uterus, for a uterus that is flexed, returns to its ol position; there is a modification in its form.

An instrument, like Simpson's, was used; the uterus wa brought to its normal position, the instrument penetrating abou two inches, the normal depth of the uterus.

I do not know what eventually became of this patient.

Retroflexion of the Uterus.

March, 1853. The attention of the class was called to a young woman, who had a displacement of the uterus. The patient had been delivered of a child, for the first time, six months before; at first, there was nothing particular in what followed the delivery; at the expiration of a month she had her menses, and the discharge from the uterus persisted; the patient said that, for five months she had been having this discharge, with perhaps, at the very most, but two or three days of interruption.

By the touch, the neck of the uterus was found in its normal situation, perhaps one-third larger than it ought to be, and rather soft than hard; the lips were largely open, so that the finger could be introduced one-third of an inch. Behind the neck, a tumor was placed, and it was a question whether this was the body of the uterus, or another body, superposed. In the first place, there was continuity between this body and the neck of the uterus, and by exploring in front, for which the best way is to use the thumb, the palmar face against the uterus, no body could be found. By searching through the abdominal walls—which were supple—the body of the uterus could not be detected. There was uniformity of movement between this body behind the neck, and the neck itself. This tumor was, therefore, decided to be the body of the uterus, which had become flexed at the neck; it was a case of uterine retroflexion.

But, in addition to the retroflexion, thus determined, M. Nélaton was disposed to believe that there was something else; the discharges from the uterus showed that there was a profound alteration of the mucous membrane; in other words, that there were fungosities there. He said he had often seen M. Récamier seek fungosities in the body of a retroflexed uterus, which he then called, in his vigorous language, a *besace*. This operation he said he would perform in this instance.

There are patients who have very marked retroflexion, with even enormous displacement of the uterus; and who follow their usual occupations, without being in the slightest degree aware of it. The most marked displacements are not always accompanied by symptoms. M. Nélaton said he would observe this case, and if there was no difficulty after the removal of the fungosities, he

would leave the rest alone. Eighteen mont
had been consulted by a lady, with retrofl
she had consulted everybody, and had read
about her complaint; she begged to be trea
Simpson. He had already employed this
bad effects, and introduced Simpson's instru
one slightly modified; in order that the e
might not strike against the top of the c
small elastic cushion was adapted below,
might rest. Twenty-four hours after its int
ing his patient, he found her most delight
which she had not done for a year. Scar
reached his house after leaving her, when he
on account of most formidable symptom
made their appearance, and on his arriva
peritonitis. The patient was actively trea
became chronic, and she died in a month
of the instrument. He has known of oth
they have made him reflect; it is true th
excessively rare; the instrument might be
dred times without any occurring, but ne
exists.

There is, again, another question: In wh
manner does this method succeed? There
the wall might be said to be membranous,
but when the instrument is withdrawn, it f
intestine. There are others, again, so ver
return to their old position. Moreover, sur
shortened the stem of the instrument, and
it scarcely enters the neck. M. Nélaton s
that a stem so short could have the effect
in its normal position, and that he was not
in these cases would be as often obtained b
cauterizations of M. Récamier.

In this case, after the uterus had been clea
the symptoms ceased, and the woman left
well.

Prolapsus of the Uterus.

December, 1851. A woman, fifty-four years of age, quite strong, and of a good constitution. She had had five children; her labors had always been long and painful, but there was nothing else remarkable about them. It was ten years since her last child was born. Five years before her entrance, while carrying a heavy iron pot, she suddenly felt a sharp pain in the lower part of the abdomen, and since that time she had always been suffering there, and her urination had been difficult.

Upon examining the vagina, the uterus was found, not in a state of complete prolapsus, but presenting at its orifice. This displacement, however, was very complicated; for, on account of the strong adhesions between the bladder and the vagina, the bladder had been drawn along with it.

The replacing of a prolapsed uterus is sometimes quite difficult; the chief means are prolonged dorsal decubitus. In order to maintain the organ in its normal position, pessaries are used; but they are inconvenient to wear, and, moreover, cause vaginal discharges. It has been attempted to bring this about by the production of cicatrices, in order to cause the contraction of the vagina. In order to form them, cauterizations were employed and advised by M. Velpeau,[1] but they have been abandoned. A portion of the tissues of the vagina has been cut away, and union made to take place by first intention between the edges; several operations have been recommended for this purpose; but although they appear very rational, they are never practised at the present time. It has been advised to seize hold of many folds of the vagina by means of serre-fines, and to leave them in place until they fall. The operation is one of extreme simplicity; it is unattended with danger, and M. Nélaton said he would try it.

By means of a long pair of forceps, ten serre-fines were placed in two rows in the vagina, five on the anterior wall, and five on the posterior; the patient experienced no inconvenience from the operation. The first serre-fine became loose from the effect of the

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[1] M. Velpeau first introduced the actual cautery into the vagina, for this purpose; but M. Gérardin cauterized the vagina in 1828, or thirteen years before Velpeau's operation.

ulceration and destruction of tissue it ca
of seventeen days, and the last on the twent
walked, and felt very much benefited; the
normal position, but it was thought prope
tion. Eight serre-fines were applied this ti
away at the end of fourteen days, and the
factory; if there were not reasons for mist
of the cure, the patient might have been se
was walking about, and able to make her
time continuing in its proper place. Eight
applied, as at the second time, as a matter
soon after they had come away, at the ex
days, the patient left the wards cured. In
the folds and indurations caused by t
serre-fins.

May, 1852. An old woman, sixty-eight
for prolapsus of the uterus. Forty-two ye
a child, and many long years elapsed after
was perceived to be the matter with the g

Upon examination, a body, like a penis i
was seen projecting at the orifice of the
orifice in this body, recognized to be the m
the surface of the neck around it was no
the anterior part of this body was a portion
not present the same consistence, and, up
found to be formed by the dragging dow
such cases, any doubts can be removed b
catheter into the bladder through the ure
the instrument being turned toward the p
to notice the volume of this uterus. Gene
a position has its circulation impeded, and
the congestion; but here it was not at all
the contrary, quite small; congestion co
given as the cause of the prolapsus. Th
again, is, sometimes, the great dimensions
such a reason could not be given. Someti
the orifice of the vulva is said to cause
nothing without a relaxation of the uterine

In the treatment of such cases, a pessary could be employed with some chance of success; but this chance depends upon the size of the orifice of the vulva, and here it was very large, as was to be expected in a patient of her age.

M. Nélaton said he would employ the method of Dr. Desgranges, of Lyons, placing serre-fines so as to seize a fold of the vagina; in the course of a few days, inflammation and ulceration take place, and the serre-fines fall, leaving a number of small wounds. He said he had seen, but eight days before, the patient whose case is related above, upon whom he had made three applications of serre-fines, and she was still perfectly well.

In order to apply these small instruments, M. Nélaton makes use of the bivalve speculum, for the fold it leaves between the valves, which is its great inconvenience, is precisely what is needed in this operation, in order to seize the tissues.

For some reasons, which he did not state, but which arose probably from the large loss of substance it was found necessary to make in this case, in order to produce a sufficient diminution in the size of the vagina, M. Nélaton did not continue the application of serre-fines, but preferred cauterization—making use of a solution of the pernitrate of mercury. The patient remained in the wards until December, when she left; her uterus was then in its normal position, and she appeared to be cured.

The Memoir of Dr. Desgranges "On the Treatment of Falling of the Womb, by a new Method," was presented to the Society of Biology, and published in their *Comptes Rendus* for 1852.

Prolapsus of the uterus is generally proclaimed to be incurable, and palliative treatment alone advised. The incurability of a disease only means that the true remedy is still to be discovered; because numerous and rational attempts have failed, to assert that success is ever impossible, is not to appreciate the genius of the sciences of observation, and to deny almost all great discoveries.

By the method he exposes in his memoir, Dr. Desgranges believes that prolapsus of the womb may be radically cured; that is to say, that the womb may be replaced in the pelvis, and be maintained there without the aid of intentive apparatus; without doing anything endangering the life, or even the functions of the organ, and without attempting anything, that, in case of failure, would make the affection more serious than it had been before.

Cauterization of the walls of the vagina very rarely succeeds; in fact, to have the slightest chance of success, it must be pushed further than is at all prudent, and than organs, which it is necessary to respect, can with impunity support.

Excision of the walls of the vagina, in the few cases in which it has been practised, has given but ephemeral results; and, at the expiration of a very short time, the prolapsus has completely returned. Moreover, the operation is long, laborious, and difficult, and exposes to the wounding of the bladder and of the rectum.

Beside the operations for the cure of prolapsus by narrowing the vagina, there are several performed to relieve the same affection by diminishing the orifice of the vulva. Dieffenbach, in imitation of what Dupuytren did for the relief of prolapsus of the rectum, excised circularly a series of small longitudinal folds at the orifice of the vagina. He counted upon the retraction of the cicatrices to produce a narrowing that would hold the uterus within the pelvis. The proceeding is then in reality but the transformation of a complete prolapsus into a partial; a desirable result, to be sure, if, at the same time that the patient was freed of the projecting tumor, she also was freed of the pains that accompany displacement of the uterus. Malgaigne thought that a preferable method was the excision of the semi-circumference of the vaginal orifice, either the anterior or the posterior, and the immediate reunion of the opposite surfaces; but the only case in which this operation was performed, was unsuccessful. Fricke, of Hamburg, practises the union of the two labia majora, leaving a small orifice for the discharge of liquids. The uterus is then supported by an artificial plane, but this plane is too low, and what Fricke calls a radical cure is but the exchange of one serious infirmity for another not less so.

These operations at the vulva do not deserve the name of radical cure, for they only transform a complete into a partial prolapsus, and at the price of a real deformity. Most women would prefer, above all, if still young, to wear a pessary, and preserve thus the genital faculties, much compromised as they are by the position of the womb.

The method of Desgranges is called by him *pinching of the vagina—pincement du vagin*—a name having the great advantage, on account of its simplicity, of being perfectly intelligible, and, above all, of explaining the manner in which the vagina is attacked by the instruments applied to it; small forceps exercising continued pressure upon a fold of that organ until it is mortified. They become the physical cause of a slow inflammation, circumscribed to the vulvo-uterine passage, and the surrounding cellular tissue, and whose final result is, for the vagina, a greater or less narrowing, an augmentation of tonicity; and, for the uterus, a return to the fixity which was wanting to it.

The mode of applying the instruments can be understood from the preceding cases, treated by M. Nélaton. In regard to the number of applications, and the number of instruments used, the rule of conduct is, "*too many are better than not enough!*" As to the parts of the vagina in which they should be placed, the sides are to be preferred, then the posterior portion, and, lastly, the anterior.

The operation is not a painful one, if the application be limited to the upper three-fourths of the vagina; in the neighborhood of the vulva, the parts are exquisitely sensible, and, in order to avoid giving the patient pain, they should be avoided.

The general reaction, after the operation, is so slight that it can scarcely be perceived, and, by care in the diet, it is over in one or two days.

By these applications, the vagina gradually loses in caliber and in mobility; still later, as cicatrization progresses, it is covered with cicatricial bridles. In time, this condition is modified; the bridles diminish in size and even disappear; the vagina reacquires its softness, and, except the caliber, there is a marked return to the normal condition.

In the memoir, eight cases treated by this new method are carefully reported. From them the following *résumé* may be made:—

I. In no case did death follow, not even a single instant of apprehension; there was complete absence of local disorders.

II. Prolapsus of the uterus is not an incurable affection, but yields to means, which constitute a *new method*, insomuch as nothing resembling it is to be found in former treatises.

III. The treatment of prolapsus is susceptible, also, of modifying with advantage other displacements and flexions of the womb.

IV. The cure is due, probably, less to the narrowing of the vagina than to an organo-plastic process, which, propagating itself beyond the organ, restores their lost tonicity to the utero-sacral ligaments, and to the cellular tissue of the pelvis.

V. The treatment does not prevent cohabitation nor fecundation; and it cannot become a cause of difficult parturition.

VI. If the cases reported are not as yet sufficiently numerous to make the method complete, those already published are abundantly sufficient to establish its perfect innocence, and to authorize legitimate hopes.

CHAPTER XXIII.

AFFECTIONS OF THE FOOT.

Deformity of the Big Toe.

April, 1853. A man, forty-five years of age, who for many years had been a soldier. He had long remarked a deformity in the right foot that is often seen; the point of the toe being thrown toward the median line of the foot, while the posterior extremity of the first phalanx projected very much on the internal side.

Six months before, over this projection, an acute inflammation took place, and an abscess formed, that opened itself. The patient entered the hospital St. Louis, where poultices were applied, and he soon went out cured. It remained closed for four months, when it again opened, and he came into the wards of M. Nélaton.

At the phalango-metatarsal articulation of the big toe, were found all the symptoms of acute inflammation, and there was a fistulous orifice there, into which, when a probe was introduced, both bones were found to be exposed, and to a very great extent. In the joint itself there was a collection of pus, and the cartilages had all disappeared. It was necessary here to amputate, in the metatarsal bone. It is an operation not free from danger, being quite often followed by death; and, again, it deprives the foot of one of its most important points of support. The oval method, the one now generally preferred, was practised; of course, the section of the bone was made oblique. This patient recovered.

Onyxis.

July, 1852. A case of onyxis was operated upon, by simply cutting away, with a bistoury, the soft parts growing over the nail. This was thought to be sufficient. M. Nélaton used to employ caustic for this purpose, but the part was dressed with charpie, care being taken to introduce some under the nail, in order to prevent a return of the affection; now he always employs the knife. The patient did not remain in the wards to await the healing of the incision.

December, 1853. A young man was operated upon by a method M. Nélaton had never before employed. He had been in the habit of practising what he said he had seen M. Gerdy do fifteen years before, the simple excision of the portion of the edge of the nail, and the flesh there where the nail entered. The only objection to this is the length of time, which is about six weeks, required for the cicatrization of the wound.

The method employed in this case, which is not new, but recently *regularized* by M. Gosselyn, consists in excising the border of flesh where the nail enters, and the part of the matrix belonging to that part of the nail.

The boy was well in seventeen days. Two months after leaving the wards, he still continued perfectly well.

Curious Affection of the Foot.

November, 1851. A young man entered the hospital, who was laboring under a very curious affection of the foot. Corresponding to the projections formed by the bones, on the plantar surface of the right foot, there would be a raising up of the epidermis; this was the first thing observed; after a time, the epidermis was destroyed, and a limpid serosity flowed away, leaving a small spot, painful to the touch. The derm itself would then be perforated by an ulceration extending from without inward, and after the fistula thus formed had existed five or six weeks, a denuded piece of bone was found, and, after a time, the elimination of this sequestrum would take place.

It was then twelve years since this affection had commenced. M. Ricord, about that time, amputated one toe; two years afterward, another; after the lapse of some time, another, &c. At the last operation performed upon this patient, M. Malgaigne had amputated all the bones of the metatarsus. Altogether, the man had undergone ten amputations from this affection, and still it continued.

M. Nélaton said this disease was one of the most singular he had ever met with, and perhaps it was unique. There are some diseases which present some analogous symptoms, as the diseases of the skin, elephantiasis, but all of them differed, in important points, from this.

Moreover, this disease was hereditary; of five children, three were affected with it.

As to its treatment, the patient could be cured by amputation, but it would return. The best plan would be to endeavor to prevent it in every possible way. Shoes were constructed for the patient, by which only the skin on the heel was pressed upon, and he then left the wards.

January, 1853. A large, stout man, about forty years of age, from the country, who had the same curious affection of the foot as the patient whose case is reported above, as having been in the wards fourteen months before. That case had been published in the *Gazette des Hôpitaux*, and, at once, other cases of this affection, which has not yet been described in medical works, were sent for publication.

From the cases reported, it appears that this is an affection of the hands and of the feet. On the foot, it shows itself where there is pressure, where the weight of the body is received. There are three fundamental points to the foot; one behind, at the heel, and two in front, at the big and little toes; and it is there that the disease commences. A small induration first appears, and after lasting some time, it is raised up by an effusion of serum beneath it, and eliminated by inflammatory action; the external surface of the derm is thus exposed, and things remain in this state for some time.

This man was in this condition; there were ulcers on the soles of his feet, at points corresponding to those places where pressure is greatest, surrounded by an edge, where the epidermis was two or three lines thick. These ulcers were painful to the touch, and the man must necessarily have suffered very much from them.

Experience has shown that this ulceration does not stop here; it will increase in depth day after day, and at last will reach the bone; there, a small bony fragment will be eliminated, and after that, sometimes, the parts get well.

The two or three patients he had seen, M. Nélaton said, had presented the same skin of the foot; it was not normal; it looked as if it had remained very long in water, and there was always much perspiration about it; there seemed to be œdema, and thickening of the skin. In one other case, the disease was hereditary; the patient had two brothers with the same affection; this one was not.

The same series of phenomena are seen on the hands, in men who follow laborious occupations.

This patient was kept in bed, and the ulcerations were easily healed by means of chlorinated water, as they always are, in these cases. When he left the hospital, he was advised to follow some occupation in which his feet would not be exposed to pressure.

November, 1852. A man, fifty-eight years of age, entered the hospital, on account of an ulcer at the heel of his right foot. In the year 1830, while in a cavalry regiment, his horse fell under him, and this foot was very much bruised; he went to the Hôtel Dieu; an effusion took place in the contused parts, which was opened, and he soon went out, cured.

Some years afterward he had pain in the heel, and went to the same hospital for advice; at that time there was a *durillon* (a thickening of the epidermis from pressure) on the heel, which was cut away, and he went out again.

When he entered, there was an ulcer at the heel, limited by a very infractuous, and very hard edge, resembling cartilage; this hardness occupied the epidermis. A sanious suppuration issued, and by the introduction of a probe, the surface of the calcaneum was found denuded.

This, M. Nélaton said, was an example of the curious disease, of which an example had already been seen in the wards, the year before, and for which so many successive amputations had been performed; commencing with a hardness of the epidermis, and then followed by gradual perforation of the derm, until the bone is reached.

This man was unable to walk, and something was to be done for him. The hard, irregular edges would be inclosed in two elliptical incisions, extending as far as the calcaneum, and then, after the extent of the disease of the calcaneum had been determined, it would be decided what was to be done. M. Nélaton said he was strongly inclined to go back to the ancient plan, and cauterize the bone by the application of the actual cautery; by this, the life of the bone would be destroyed, and a frank, healthy inflammation was to be hoped for, in the neighboring parts, by which the sequestrum would be eliminated, and the parts would then heal. If they should heal, a return of the disease would be prevented by every means; experience shows that pressure leads infallibly to a return, and a peculiar shoe would be contrived.

This treatment was carried out; all the hardened skin was freely excised, and the incisions were even carried beyond it, and the bone was cauterized with the hot iron. The elimination of the sequestrum was waited for, for several months (until May, 1853), but it did not take place. Besides, the foot became deformed from enlargement of the calcaneum, and the patient, who was not one who would complain for a trifle, suffered great pain.

It was not proper, here, to repeat the cauterization, for it would not succeed any better than the first, and, besides, the whole bone was undoubtedly affected. The whole of the calcaneum could be resected, but what would the foot be without it? rather than be of service, it would prove an annoyance. It was necessary here, in order to relieve the man, to perform an amputation, either under the astragalus, or in the joint, or above the malleoli. The sub-astragalian operation is a good one; it had recently been performed in the hospital, and the patient walked very well, having something in his shoe to raise the limb about an inch; to a level with the other. The operation is a good one, but on one condition, namely, that the astragalus be covered by the skin of the heel; a cicatrix must never be left below, in such cases; the integuments there, must always be healthy. Here, the diseased state of the soft parts at the heel rendered the fulfilment of this indispensable condition impossible. Another consideration was the size of the flap; and the suppuration which takes place constantly while the parts are cicatrizing; all patients are not able to support this, and this patient, who was fifty-eight years of age, was not in a condition to do so himself.

The amputation at the joint is a good operation, but the bones must be covered by healthy integument, and it was rejected for the same reasons as the other, below the astragalus.

The limb would therefore be amputated just above the malleoli. The operation has the great inconvenience of leaving a stump, not well adapted to the application of a wooden leg; but it is infinitely less dangerous than the one higher up, at the *siege d'élection*, and as in view of life and death, it was chosen.

This operation was performed, and the patient recovered. He left the hospital cured, and I never heard of him afterward.

Club-Foot.

February, 1852. A young girl, fifteen years of age, entered the hospital for an affection of the feet. The only thing she complained of was pain in the feet, after a long walk.

The feet—and it was most marked on the left side—presented the deformity known as the flat-foot. The arch of the foot had disappeared, and was replaced by a straight line; the internal border of the foot was convex, not concave; the scaphoid, above all, being prominent; and the external border, in place of being convex, presented a concavity, or at least a right line; the projection of the posterior extremity of the fifth metatarsal bone had almost disappeared. The sole of the foot was turned outward, so that the body was supported rather on the internal side of the foot, than the external. The axis of the foot was perpendicular to the axis of the leg; the patient could not depress the point of the foot, and she could flex it but very little.

In order to determine what muscles had brought about this deformity, the torsion of the foot was practised, to bring the sole to its normal position; the lateral peroneal muscles became like unyielding cords. When the point of the foot was depressed, another cause of deformity was found to reside in the extensors. M. Nélaton believes that, in these cases of club-foot, in addition to the condition of the muscles, there is also a deformity of the bones.

All the different varieties of club-foot are comprised under four principal species; sometimes the foot is turned inward (*varus*), or outward (*valgus*); or it is in forced extension, and only rests upon the ground by the extremities of the toes (*pes equinus*); or, on the contrary, by exaggerated flexion, its dorsal face is turned against the anterior region of the leg, and the foot only touches the ground by the heel (*pes talus*).

Varus results from the contraction, first of the tibiales, anticus and posticus, and afterward of the gastrocnemii, and of the flexors of the toes; the peroneal muscles, on the contrary, are relaxed and enfeebled. It is just the opposite in valgus.

In pes equinus, there is often only a deficiency in the length of the tendo-Achillis, and, consequently, of the gastrocnemii and soleus muscles. In the pes talus—which is the rarest kind of all—there is shortening of the extensors of the toes, of the tibialis anticus, and of the peroneal muscles. Most generally, however, these four kinds of club-foot are combined together, two by two; for instance, pes equinus is at the same time valgus or varus.

According to M. Bonnet, there are but two kinds of club-foot; those caused by the retraction of the muscles supplied by the internal popliteal nerve, and those caused by the retraction of the muscles supplied by the external. To each kind he makes five degrees. The first degree of the kind, called external popliteal club-foot, is the flat-foot; the second, the third, and the fourth, correspond to valgus; and the fifth, if it existed alone, would be talus, the existence of which M. Bonnet denies. The first and second degrees of internal popliteal club-foot correspond to pes equinus; the third to pes equinus varus, and the fourth and the fifth to varus.

M. Nélaton only mentioned the theory of M. Bonnet, without declaring his opinion on the subject.

In this case, the contracted muscles would be divided, by which the normal direction, though not its configuration, would be restored to the foot. M. Nélaton made the subcutaneous section of the peroneal muscles. They can be cut in different parts, but he prefers to do so below the malleolus. The foot was immediately brought to its normal direction, and afterward an apparatus was applied to retain it there.

July, 1853. A little child from the country, but two months old, with a congenital club-foot.

As to the cause of the affection, inquiries were made as to the existence of hereditary predisposition. This was the seventh child, and none of the others had been affected. The mother said she knew that one of her nieces was troubled in the same way. *The great majority of patients with club-foot belong to families where there are congenital vices of conformation;* they may be hare-lip, or spina bifida, or any other affection arising from arrest of development.

This club-foot was of the variety varus, constituted by the turning of the foot inward. The foot was not even placed transversely beneath the bones of the leg, but it inclined upward. The part corresponding to the big toe was turned up; the part corresponding to the little toe, down.

It is impossible, by the touch, to tell with precision, the situation of the different bones of the foot in the several varieties of club-foot; this must be known beforehand, and it has been most admirably studied by Scarpa.

In varus, the astragalus preserves nearly its normal situation; it however experiences a slight rotation, in virtue of which its superior face is thrown outward, while the inferior face becomes internal. The calcaneum following the astragalus, in its deviation, its external face is turned down, and rests upon the ground. It is, however, in the articulations between the first and the second rows of the tarsus that the principal displacement takes place. The scaphoid and cuboid are turned toward the internal border of the foot; the first of these bones abandons, in a great measure, the head of the astragalus, and directs itself inward, then backward, in such a way that its internal extremity is articulated with the calcaneum, sometimes even with the internal malleolus; the cuboid is drawn along with the preceding bone; it glides from without, internally upon the articular face presented by the calcaneum, and can, even in an extreme degree of deformity, abandon it entirely.

At first, as is proved by the examination of club-feet in infants, the bones which have undergone these displacements are not notably deformed. At a later period of life, however, the bones placed in contact with surfaces not formed to receive them, and submitted to unusual pressures, are atrophied in some places, are hypertrophied in others, and from this result more or less marked changes in their configuration.

Here it was necessary to bring the feet to their normal position, and to keep them there. For this purpose innumerable apparatuses have been invented, from a simple figure of 8, to the most complicated. M. Nélaton did not describe any of them, as, to be understood, they should be seen. Whether one of these apparatuses was to be employed was a delicate question; on an adult there is no reason for hesitation, but upon so young a child the pressure would certainly cause eschars.

The apparatus he used here was very simple, and one he imagined at the time. The foot being held in a good position, a bandage coated with plaster was placed upon the internal half of the limb, and held there until it became cold. This mould, corresponding, of course, exactly to the limb, was then held in position by strips of caoutchouc. One advantage of this plan, which answered admirably, at least so long as the child remained in the wards, was, that it permitted of the examination of the parts at any moment.

In these cases in children, M. Nélaton thinks no time should be lost, for there is a consecutive deformation of the bones, and retraction of the muscles. The foot can be redressed without any surgical operation; there are retracted muscles, it is true, but traction suffices when the patient is so very young.

Hereditary transmission, and, consequently, a primordial alteration of the germ is a frequent cause of organic deviations.

Like all the acts of that order which, in physiology, have received the name of *results*, it is specially connected with one of the elementary acts of the organism; just as calorification is connected particularly with nutrition, and with the functions called nutritive, hereditary transmission is connected particularly with the function of reproduction. It is connected most particularly to this fact; that the anatomical elements have the property of giving birth directly to elements like themselves, or to determine in their neighborhood the generation of elements of the same kind.

In order to understand the phenomena of hereditary transmission, it is necessary, moreover, to know that organic substances enjoy the property of transmitting, by simple contact with substances of another kind, the peculiar molecular condition that some exterior circumstance has produced in them.

Now, there are certain general conditions of the organism, certain aptitudes, that evidently do not reside only in a simple, temporary arrangement of the tissues, or of the humors, but that, on the contrary, have developed a peculiar molecular modification in every point of the organism. From the property possessed by organic substances, of transmitting in a slow, but continued manner, their own molecular condition, to the substances with which they are in contact, it is evident that all the parts which will be produced in consequence of the development of this first generating molecule, will be modified either for good or for evil, according to the condition it had itself. It is, therefore, comprehensible how the spermatozoids, or the male embryonic cells, can transmit to the female embryonic cells, or to the blastoderm, of which they determine the birth at the expense of the vitellus, fecundated by them, the peculiar conditions by which they themselves are affected, and which belong to the male from whom they are derived; hence, hereditary transmission; transmission modified more or less by the condition that was proper to the spermatozoids, as well as to the entire organism of the female.

It is, moreover, comprehensible, that aptitudes can thus be transmitted; pathological affections, that have modified the organism, even to its most inmost elements, will also act in the same way.

Without a proper knowledge of the conditions under which organic substances are formed and exist, and of the properties they enjoy by contact with one another, it has been impossible to understand nutrition, and hereditary transmission has found no rational explanation.

Examples are constantly being seen of the resemblance of products with the producers, as well in physical conformation as in moral disposition. And not only innate peculiarities are transmitted by inheritance, but, also, acquired peculiarities. It is by this that races of domestic animals are created, endowed with special qualities.

Hereditary transmission plays a considerable part in sociology, and, mankind in general being considered, it is seen to intervene in the evolution of civilization. Without hereditary transmission, history would want one of its essential causes. That which is gained by the labors of better, more active, more penetrating natures, at last becomes consolidated in others by the aid of the action of hereditary transmission; and thanks to this action, civilized people take certain aptitudes, certain tastes, certain inclinations, that, on the one hand, keep them from relapsing into barbarism (which is sometimes done by individuals), and, on the other hand, offer a solid basis to a new development of aptitudes more powerful, tastes more delicate, and inclinations better controlled.

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